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BULLETIN

OF THE

INTERNATIONAL RAILWAY ASSOCIATION

(ENGLISH EDITION)

[385. (06.411]

SPECIAL QUESTION

Constitution. — Compilation of rules and regulations of the International Railway Association.

REPORT

By J. VERDEYEN,

CHIEF ENGINEER AND INSPECTOR OF DIRECTION OF THE BELGIAN STATE RAILWAYS, SECRETARY OF THE PERMANENT COMMISSION OF THE INTERNATIONAL ASSOCIATION.

The provisional constitution of the International Railway Association is the same as that which governed the development of its predecessor, the International Railway Congress Association, for more than twenty-five years. Only one change has been made, the addition of article 3*a* which refers to the countries which may be included in the Association.

As years went by, however, this constitution had to be slightly modified as occasion required.

Experience has shown that the constitution was drawn up in such a way as to present no obstacle of any kind to progress, therefore we think it advisable now to make as few alterations as possible. It has moreover served as a model for several similar associations, such as the Navigation Congress and the Tramways Union.

We propose therefore that the following changes only should be made :

ARTICLE 1.

Alter this article as follows :

The object of the International Railway Association is to facilitate the progress and development of railways by the holding of periodical Congresses and by means of publications.

The headquarters of the Association are at Brussels.

It appears desirable to mention the word « Congress » in the object of the Association, providing it does not cause a new change in the official title of our Association that might embarrass certain individuals and so prejudice the continuity of our work and publications.

It is advisable to state where the headquarters of the Association are situated.

ARTICLE 2.

Alter this article as follows :

The Association is composed of State Railway Administrations, or of Administrations of railways conceded to, or worked by, public initiative, and belonging to the countries which have joined the Association.

The Governments of the countries to which the Association extends may also join the Association.

The Association is originally composed of the participating Railway Administrations included in the list shown in appendix of the present rules.

The list of the countries belonging to the Association included in this appendix can only be altered by a decision of the Congress as laid down in the revised rules in article 20.

The constitution must declare what bodies may join the Association.

The Congress cannot authorise its Permanent Commission to exclude any particular country. It should preferably only grant the Commission power to take action *provisionally* as in case of elections.

ARTICLE 3.

Replace this article by the following :

The Association acts through a Permanent Commission composed of members nominated according to article 6 and sitting at Brussels.

This is merely a verbal alteration.

ARTICLES 3*a* and 4.

Replace article 3a and the first paragraph of article 4 by a single article reading as follows :

ART. 4. — The Permanent Commission can, by a postal vote, giving a majority of three quarters of the total membership, provisionally alter the list of countries belonging to the Association subject to ratification by the next Congress. It has power to arrange for the admission of railway companies who apply.

In consequence of the revision of the last paragraph of article 2 (see above).

Only those administrations may be admitted whose principal business is the running of railways worked by mechanical traction of a length of at least 62 miles (100 kilometres) in active service, or conceded to a public company and worked in the public interest.

In order to calculate the minimum of 62 miles (100 kilometres), mountain sections where special means of haulage are employed may be counted as double their actual length. All railway companies which have been admitted after 6 October 1906 and which have ceased to fulfil the preceding conditions, or have gone into liquidation or have failed, will cease *ipso facto* to form part of the Association. The same shall apply to railway companies which have not paid their subscriptions for more than two years.

The principal conditions of admission at least should figure in the rules, consequently, conditions of exclusion must be included as well.

The second paragraph of the present article 4 forms the new article 5.

Change the words : « It is the duty of the Commission » *to the words :* « Independently of the above mentioned powers, the Commission ».

Verbal alteration.

ARTICLE 5 (new article 6).

In the first paragraph instead of « 45 members » *put* « 48 members ».

In order to comply with the custom of increasing the representation on the Congress of the country in which it is held.

Between the second and third paragraphs insert old article 7 by altering the three first paragraphs as follows :

« One third shall retire at each Congress and are eligible for re-election. »

Verbal alteration.

And by substituting in the last paragraph the words « election of members who must be delegates » *by the words* « by co-opting delegates of the participating administrations and adherent governments ».

Add to the new article 7 the last paragraph of the old article 5.

ARTICLE 6 (new article 7).

In the first paragraph replace « after a Congress » *by* « after each Congress ».

Between the first and second new paragraphs insert the last paragraph of old article 5.

And add the following paragraph :

The President and the chief Vice-President shall be chosen from the Belgian members.

This addition conforms to the traditional rule.

Add an article arranged as follows :

ART. 8. — The Association shall be represented in Courts of Justice and in all civil actions by the President, or in the event of his being unable to attend, by the General Secretary of the Permanent Commission.

It is necessary to decide which members of the Commission may appear in a Court of Justice.

As at present arranged, if the Association or its Permanent Commission were subpoenaed, it would be necessary to subpoena each Administration or each member of the Permanent Commission.

Old article 8 becomes article 9.

Omit from the first paragraph « and the Ex-Presidents who are members ex-officio ».

Ex-Presidents of a session have rarely been able to join the Committee.

In the third paragraph delete the words : « and act respectively as Secretary and Treasurer of the Committee ».

Old article 9 forms the completion of new article 9.

In the third paragraph replace « the officers shall carry out the instructions of » *by* « is entrusted to the President and the General Secretary ».

It is advisable to state exactly who is responsible for carrying out the instructions of the Committee.

ARTICLE 10.

Instead of « every two years » *put* « every five years ».

In practice at least five years have elapsed between each Congress. There is no necessity to name any other figure, as the general assembly having full power could decide on a longer period. Besides, the second paragraph of article 10 allows the Permanent Commission to alter the arrangements made by the Congress in case of need.

ARTICLE 11.

Substitute for paragraphs 1 and 3 :

1° The members of the Permanent Commission, the Secretaries and the Treasurer;

3° The Secretaries of sections, and the Reporters appointed by the Commission or its Executive Committee to report on the items on the agenda;

In the sixth paragraph in place of « eight delegates » *put* « ten delegates ».

It seems advisable to reduce the representation of the smaller systems and slightly to increase that of the larger ones.

Replace the seventh, eighth, ninth and tenth paragraphs by the following new article 12 :

ART. 12. — Railway Administrations shall be entitled to nominate up to ten delegates, according to the mileage of their system in the following ratio;

One delegate for lines of not more than 125 miles (200 km.);

Two delegates for lines of 125 to 312 miles (200 to 500 km.);

One additional delegate for each additional 312 miles (500 km.) or fraction thereof above 312 miles up to 1 875 miles (3 000 km.);

One additional delegate for each additional 625 miles (1 000 km.) or fraction thereof above 1 875 miles.

The adherent governments may also nominale ten delegates as a maximum in the proportion of one delegate for each 200 fr. (£8 or $40) subscription up to 1 000 fr. (£40 or $200), and one additional delegate for each 500 fr. (£20 or $100) over 1 000 fr. (£40 or $200).

The maximum figures quoted above do not include those members who take part in the Congresses, as per article 11, and whom the participating administrations or adherent governments include amongst their delegates.

All delegates participate in the Congresses with equal rights.

For the same reason that the number of delegates is fixed for the participating administrations according to their working mileage, it also seems necessary to fix the number of delegates of the adhering countries according to the amount of their subscription. This is fixed in the currency of the country and calculated on the basis of its nominal value.

The same rule as regards the subscription applies also to participating administrations.

ARTICLES 12 and 13.

Replace these articles by the article 13 (new) as follows :

ART. 13. — At the opening of each Congress, the officers of the Permanent Commission shall hold office temporarily, until the Congress has elected its own officers as follows :

1° One or more honorary presidents and vice-presidents;

2° One president;

3° Presidents of sections elected as explained in article 14;

4° A chief secretary and one or more assistant secretaries.

The delegate nominated first by each government shall be an ex-officio vice-president.

All officers shall be appointed for the duration of the session.

The election shall take place according to the rules laid down in article 16, paragraph 6. The duties of the officers shall be those laid down by standing orders adopted by « deliberative assemblies » for the conduct of their proceedings.

After the appointment of the officers, the Congress shall divide into sections, according to the arrangements of items on the agenda submitted by the Permanent Commission.

A member may enter his name for more than one section.

The Congress may also appoint special committees to investigate certain questions.

Verbal alteration.

ARTICLE 14.

Add after « each section » *the words* « or Committee ».

ARTICLE 15.

Add the following paragraph :

No question shall be discussed at a general meeting without having been first considered by a section or special committee.

In consequence of the change made to article 13.

ARTICLE 16.

Omit the third paragraph.

In consequence of the change made to article 15.

ARTICLE 18.

Replace the first paragraph by the following :

Payment of the subscriptions shall entitle the participating administrations and adherent governments to receive free, as many reports of the proceedings as the number of their delegates plus one.

Verbal alteration.

ARTICLE 20.

Replace by the following article :

ART. 20. — Every proposal for a revision of the rules must be submitted to the Permanent Commission, with reasons in support of it, at least three months before the date fixed for the opening of the session, in order that it may be brought by the Commission to the knowledge of the members of the Association at least one month before that date.

The proposition cannot be discussed at a full meeting of the Congress, unless it has been agreed to either by the Permanent Commission, or if 25 members desire that the question shall be discussed.

In the first case, it shall be discussed on the report of the Permanent Commission; in the second case on the report of a special committee.

Verbal alteration.

ARTICLE 22 (new).

The Association may be dissolved by a three quarters majority, on a postal vote from the participating administrations, each one having a number of votes equal to that of the delegates to which it is entitled.

Provision should be made for the dissolution or winding up of the Society as is done by the rules of similar Associations, and we propose that a postal vote should be given by the participating railway administrations, because it would more fully represent the opinion of the members of the Association.

The meeting of an assembly expressly convened to discuss dissolution would be faced with a multiplicity of difficulties,

and the vote of the delegates present might be in complete disagreement with the desire of the majority of the railway administrations forming part of the Association.

ARTICLE 23 (new).

In the event of dissolution, the Permanent Commission shall have authority to arrange the liquidation. By its agency the assets of the Association are to be distributed among works conforming with the objects of the Association or among philanthropic works in connection with railways.

In a scientific association like that of the International Railway Association, the subscriptions are levied without any thought of monetary profit, to defray current expenditure, and only to the extent necessary to achieve the objects in view. It would therefore be more appropriate, in the event of dissolution, to devote the funds to the purposes for which they were given, than to return them to the participators. The Association of the Congress of Navigation have formulated their rules in this respect in the same spirit.

ARTICLE 24 (new).

In no circumstances shall participating administrations and adherent governments, who for any reason have ceased to belong to the Association, have any claim on the assets of the Association.

N. B. — In addition to the change mentioned above, a few slight alterations have been introduced into the text, in order that the customary terms « participating administrations » and « adherent governments », which have been sanctioned by custom, may appear uniformly.

This report was entirely drawn up with the concurrence of the Vice-President, Mr. Colson, and the late lamented General Secretary, Mr. L. Weissenbruch. It was submitted to the Permanent Commission and approved by it at the meeting on the 9 July 1921, subject to a few slight alterations being made which we have introduced.

As was done at Milan in 1887, the proposal will be discussed in Rome in 1922 by a special section composed of the Permanent Commission, to which will be added two members per section (the President and the principal Secretary).

Rules and Regulations of the International Railway Association.

(Ninth congress. — Rome 1922.)

Objects, headquarters and constitution of the Association.

ARTICLE 1. — The object of the International Railway Association is to facilitate the progress and development of railways by the holding of periodical Congresses and by means of publications. The headquarters of the Association are at Brussels.

ART. 2. — The Association is composed of State Railway Administrations, or of Administrations of railway conceded to, or worked by, public initiative, and belonging to the countries which have joined the Association.

The Governments of the countries to which the Association extends may also join the Association.

The Association is originally composed of the participating Railway Administrations included in the list shown in appendix of the present rules.

The list of the countries belonging to the Association included in this appendix can only be altered by a decision of the Congress as laid down in the revised rules in article 20.

Permanent Commission.

ART. 3. — The Association acts through a Permanent Commission composed of members nominated according to article 6 and sitting at Brussels.

ART. 4. — The Permanent Commission can, by a postal vote, giving a majority of three quarters of the total membership, provisionally alter the list of countries belonging to the Association subject to ratification by the next Congress. It has power to arrange for the admission of railway companies who apply. Only those Administrations may be admitted whose principal business is the running of railways worked by mechanical traction of a length of at least 62 miles (100 km.) in active service, or conceded to a public company and worked in the public interest.

In order to calculate the minimum of 62 miles (100 km.), mountain sections where special means of haulage are employed may be counted as double their actual length. All railway companies which have been admitted after 6 October 1906 and which have ceased to fulfil the preceding conditions, or have gone into liquidation or have failed, will cease *ipso facto* to form part of the Association. The same shall apply to railway companies which have not paid their subscriptions for more than two years.

ART. 5. — Independently of the above mentioned powers, the Commission shall be authorised to organize the Congress meetings, to prepare an agenda for discussion and be responsible for their preliminary treatment, to edit and publish reports of the discussions, to draw up a balance sheet, to fix, subject to article 17, the amount of the annual subscriptions, to be responsible for the finances, and generally to set on foot any investigations and to issue any reports or other publications which will, in its judgment, further the objects of the Association.

ART. 6. — The Permanent Commission shall be composed of ex-presidents of the sessions of the Congress, ex-officio members, and forty-eight elected members.

The elected members shall be, as far as possible, chosen to represent the different nations. Under no circumstances shall any one nation have more than nine elected members.

One third shall retire at each Congress and are eligible for re-election.

A member who has ceased to hold office under a government, or with a railway administration, represented in the International Railway Association, shall cease to be a member of the Permanent Commission. It shall be the duty of such a member at once to inform the president when he was retired. The Permanent Commission may, upon the application of five members, with the consent of the majority of all its members consulted by letter, ask him to remain until the next Congress.

The Commission shall always have the power to complete its number by co-opting delegates of the participating administrations and adherent governments. In this case a final election shall be held at the following Congress.

When the place of meeting of a Congress has been fixed, the Permanent Commission shall have power to co-opt as temporary members representatives of the country in which the Congress is to be held.

ART. 7. — The Permanent Commission shall elect from among its members a president and two vice-presidents at its first meeting after each Congress of the Association.

The Commission shall appoint a general secretary, secretaries and a secretary treasurer. As such they shall have the right to take part in discussions, but not to vote.

The president and the chief vice-president shall be chosen from the Belgian members.

The Commission shall be summoned by the president if and when the business of the Association requires it, but in any case at least once a year.

Any five members may require a meeting to be called. The chair shall be taken by the president, or, in his absence, by one of the vice-presidents.

Questions shall be decided by the votes of the majority of members present. If the votes are equal, the Chairman shall have the casting vote.

Minutes shall be kept of the proceedings of the Commission. Nine members shall form a quorum.

If at a first meeting this number is not present, the meeting shall be adjourned for a fortnight, and at the meeting so adjourned, no quorum shall be necessary for the transaction of business.

ART. 8. — The Association shall be represented in Courts of Justice and in all civil actions by the president, or in the event of his being unable to attend, by the general secretary of the Permanent Commission.

Executive Committee.

ART. 9. — At its first meeting after a Congress, the Commission shall nominate five of its members to form, together with the president of the Commission, an Executive Committee.

The president of the Permanent Commission shall also be president of the Executive Committee.

The general secretary, the secretaries and the secretary treasurer of the Commission shall be members of the Committee and shall have the right to take part in discussions, but not to vote.

The members of the Executive Committee shall hold office for a period equal to the interval between two Congresses. They shall be eligible for re-election.

The Executive Committee shall meet at least once in every three months. It may be summoned specially either by the president on his own authority or on the requisition of three members.

The Committee shall be responsible in particular for the management of current affairs and for financial business; also for superintending and managing investigations, reports and publications; for the editing of the *Bulletin* and for the care of the library and archives. It shall decide as to printing in whole or in part the reports and other documents submitted to a Congress, the circulation of which it regards as necessary to facilitate the discussions. It shall be the duty of the Committee

to furnish members of the Association with such special information as they may require.

The Committee shall have the right to appoint and to dismiss the staff.

The carrying out of the decisions of the Committee is entrusted to the president and the general secretary (1).

Congresses.

ART. 10. — The Association shall meet in Congress once in *every five years.* At each Congress it shall fix the time and place for the following Congress.

The Permanent Commission may alter such arrangements, if unforeseen circumstances render this necessary.

ART. 11. — The following shall have a right to attend the meetings :

1° The members of the Permanent Commission, the secretaries and the treasurer;

2° Delegates appointed by the railways and Governments comprised in the Association;

3° The secretaries of sections, and the reporters appointed by the Commission or its Executive Committee to report on the items on the agenda.

ART. 12. — The participating Railway Administrations shall be entitled to nominate up to ten delegates, according to the mileage of their system in the following ratio :

One delegate for lines of not more than 125 miles (200 km.);

Two delegates for lines of 125 to 312 miles (200 to 500 km.);

One additional delegate for each additional 312 miles (500 km.) or fraction thereof above 312 miles up to 1 875 miles (3 000 km.);

One additional delegate for each additional 625 miles (1 000 km.) or fraction thereof above 1 875 miles.

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(1) *By-laws of the Executive Committe.*

I. — (Art. 9 of the constitution).

II. — The Executive Committee shall meet at its office, 17, rue de Louvain, Brussels, when summoned by the president, whenever possible on the last Saturday in the month.

In the absence of the president, the Committee shall appoint one of its members to take the chair.

The business to be transacted shall be specified in the notice convening the meeting.

III. — The quorum of the Committee shall be three. Minutes of the meetings shall be sent to all members of the Committee.

IV. — The business of the Committee shall be divided under the same headings as the proceedings of the Congress (see art. 13 of the constitution).

Questions of importance shall be referred to some member of the Committee for his report.

V. — The Committee may engage and pay for expert assistance.

VI. — Letters shall be signed by the president or by the secretary acting under his authority.

VII. — The president, with the assistance of the secretary of the Committee, shall be responsible in particular for the publication of the *Bulletin*, but articles to be inserted shall always be previously approved by another member appointed by the president to form one of the Editorial Committee.

In case of difference, the matter shall be referred to the decision of the Executive Committee.

Where papers referring to items on the agenda are printed, the responsibility for them shall rest with their authors.

The same rule shall apply to the reports of debates revised by the speakers.

VIII. — The treasurer shall keep account of receipts and expenditure.

In accordance with article 4 of the constitution, the financial management of the Association is in the hands of the Permanent Commission. Accordingly, at each meeting of the Committee, the general secretary of the Commission shall examine the receipts and the vouchers.

Subscriptions shall be payable to the Permanent Commission, and the receipts relative thereto checked by its general secretary.

The treasurer shall submit an abridged balance sheet at each meeting of the Committee.

Money other than cash in hand shall be deposited in a bank in the name of the Commission. Two signatures, that of the treasurer and that of the general secretary, or of the president of the Commission, shall be necessary for withdrawing such money.

IX. — Within the limits of the budget voted by the Commission, the Committee shall fix the salaries of the staff.

The adherent governments may also nominate ten delegates as a maximum in the proportion of one delegate for each 200 fr. (£8 or $40) subscription up to 1 000 fr. (£40 or $200), and one additional delegate for each 500 fr. (£20 or $100) over 1 000 fr.

The maximum figures quoted above do not include those members who take part in the Congresses, as per article 11, and whom the participating administrations or adherent governments include amongst their delegates.

All delegates participate in the Congresses with equal rights.

ART. 13. — At the opening of each Congress, the officers of the Permanent Commission shall hold office temporarily, until the Congress has elected its own officers as follows :

1° One or more honorary presidents and vice-presidents;

2° One president;

3° Presidents of sections elected as explained in article 14;

4° A chief secretary and one or more assistant secretaries.

The delegate nominated first by each government shall be an ex-officio vice-president.

All officers shall be appointed for the duration of the session.

The election shall take place according to the rules laid down in article 16, paragraph 6. The duties of the officers shall be those laid down by standing orders adopted by « deliberative assemblies » for the conduct of their proceedings.

After the appointment of the officers, the Congress shall divide into sections, according to the arrangements of items on the agenda submitted by the Permanent Commission.

A member may enter his name for more than one section.

The Congress may also appoint special committees to investigate certain questions.

ART. 14. — Each section or committee shall appoint its own president, its own chief secretary and its secretaries. The presidents of sections shall be officers of the Congress in virtue of their position.

The sections and the special committees shall cease with the termination of each session.

ART. 15. — The discussions of the Congress shall be confined to the questions decided upon by the Permanent Commission, due regard being had to the wishes of the preceding Congress and its sections.

The Commission shall receive suggestions from the participating and constituent bodies. A reporter appointed by the Commission shall prepare a brief outline of each question without expressing conclusions, and also a summary of the contents of the documents which have reached him.

No question shall be discussed at a general meeting without having been first considered by a section or special committee.

ART. 16. — The discussions shall be conducted in French or in the language of the country in which the Congress is held. Speeches in any other language shall be translated into French.

The minutes and reports shall be drawn up in French, but speakers shall be entitled to have their original words printed side by side with the translation.

The officials of the respective sections shall draw up an abstract of the discussions setting forth the various opinions expressed in the section. After receiving the approval of the section these abstracts shall be submitted to the general meeting. They shall then be inserted in the minutes after having been completed by the addition, if necessary, of any new opinions expressed at the general meeting itself.

The Congress shall not vote except on questions of management or organization.

On these special questions, the votes of the majority of the members present shall be taken by members rising in their places. If there is any doubt, the votes shall be counted. A roll call shall not be held except at the request of not less than twelve members.

Subscriptions and auditing of accounts.

ART. 17. — The expenses of the Congresses, of the Permanent Commission and of the Executive Committee shall be covered by :

1° The annual subscriptions of members;
2° Subsidies and other casual receipts.

The annual subscriptions shall consist of :

a) In the case of adherent governments, an amount fixed by themselves;

b) In the case of participating administrations, a fixed sum of £4 ($20), plus a sum proportionate to the mileage of the system. This variable sum, which is required to meet the expenses of the Association, shall not exceed 4 d. (8 ct.) per mile.

The financial year shall begin on the 15 April.

ART. 18. — Payment of the subscriptions shall entitle the participating administrations and adherent governments to receive free, as many reports of the proceedings as the number of their delegates, plus one.

Any other publications of the Association shall be sent to the subscribing administrations in numbers based upon their mileage, in conformity with article 11.

ART. 19. — The Permanent Commission shall present to each Congress a report on the financial position. The Congress shall appoint two auditors to pass the accounts.

Revision of the constitution, dissolution and liquidation.

ART. 20. — Every proposal for a revision of the rules must be submitted to the Permanent Commission, with reasons in support of it, at least three months before the date fixed for the opening of the session, in order that it may be brought by the Commission to the knowledge of the members of the Association at least one month before that date.

The proposition cannot be discussed at a full meeting of the Congress, unless it has been agreed to either by the Permanent Commission, or if 25 members desire that the question shall be discussed.

In the first case, it shall be discussed on the report of the Permanent Commission, in the second case on the report of a special committee.

ART. 21. — Adherent governments and participating administrations constituting the Association pledge themselves to promote the meetings of the Congress and the work of the Permanent Commission.

ART. 22. — The Association may be dissolved by a three quarters majority, on a postal vote from the participating administrations, each one having a number of votes equal to that of the delegates to which it is entitled.

ART. 23. — In the event of dissolution, the Permanent Commission shall have authority to arrange the liquidation.

By its agency the assets of the Association are to be distributed among works conforming with the objects of the Association or among philanthropic works in connection with railways.

ART. 24. — In no circumstances shall participating administrations and adherent governments, who for any reason have ceased to belong to the Association, have any claim on the assets of the Association.

List of affiliated administrations.

NAMES OF THE ADMINISTRATIONS.	Kilomètres.	OFFICES.
ARGENTINE (REPUBLIC).		
I. — *Lines of the State.*		
Chemins de fer de l'Etat	6 140	Buenos-Aires.
II. — *Private lines.*		
Buenos Ayres Great Southern Railway	6 278	London.
Buenos Ayres Western Railway	3 028	London.
Central Argentine Railway	5 319	London.
Entre Rios Railways	1 175	London.
Chemin de fer de Rosario à Puerto Belgrano	800	Paris.
Chemins de fer de la province de Santa-Fé	1 911	Paris.
BELGIUM.		
a) Continent.		
I. — *Line of the State.*		
Chemins de fer de l'Etat	4 640	Bruxelles.
II. — *Private lines worked by the State.*		
Chemin de fer de Braine-le-Comte à Gand	65	Bruxelles.
Chemin de fer d'Eecloo à Bruges	28	Bruxelles.
Chemin de fer de Tournai à Jurbise et de Landen à Hasselt	46	Bruxelles.
III. — *Private lines.*		
Chemin de fer de Chimay	61	Chimay.
Chemin de fer de Malines-Terneuzen	68	Saint-Nicolas.
Chemin de fer du Nord français (lignes Nord belges) . . .	170	Liége-Longdoz.
IV. — *Secondary lines of the State.*		
Société nationale des chemins de fer vicinaux	4 095	Bruxelles.

NAMES OF THE ADMINISTRATIONS.	Kilo-mètres.	OFFICES.
V. — *Secondary private lines.*		
Société générale de chemins de fer économiques	116	Bruxelles.
Railways économiques de Liége-Seraing et extensions . . .	20	Liége.
Compagnie belge de chemins de fer et d'entreprises	300	Bruxelles.
VI. — *Other companies.*		
Compagnie internationale des wagons-lits et des grands express européens	(1)	Bruxelles.
Compagnie auxiliaire internationale de matériel de chemin de fer	(2)	Bruxelles.
***b*) Colony.**		
Chemin de fer du Congo	400	Bruxelles.
Chemin de fer du Bas-Congo au Katanga	750	Bruxelles.
BOLIVIA.		
BRAZIL.		
Compagnie des chemins de fer de l'Est brésilien	1 934	Paris.
Great Western of Brazil Railway	1 625	London.
CHILI.		
Antofagasta (Chili) and Bolivia Railway	1 318	London.
Nitrate Railways	631	London.
Taltal Railway	290	London.
CHINA.		
Compagnie générale de chemins de fer et tramways en Chine	551	Bruxelles.
COSTA-RICA.		
Costa-Rica Railway	306	London.
CUBA.		
DENMARK.		
I. — *Lines of the State.*		
Chemins de fer de l'Etat	2 401	Copenhague.

(1) 4 664 passenger-axles, 576 freight-axles.
(2) 2 584 freight-axles.

NAMES OF THE ADMINISTRATIONS.	Kilomètres.	OFFICES.
II. — *Private lines.*		
Chemin de fer de l'Est de Seeland	47	Copenhague.
Chemin de fer de la Fionie méridionale	216	Odensée.
Chemin de fer de Lolland-Falster	104	Copenhague.
DOMINICA (REPUBLIC).		
EGYPT.		
Chemins de fer de l'Etat	3 181	Le Caire.
ECUADOR.		
SPAIN.		
Chemins de fer andalous	1 703	Madrid.
Chemins de fer catalans (réseaux de la Compagnie du chemin de fer central catalan, du chemin de fer du Nord-Est de l'Espagne et du tramway ou chemin de fer économique de Manrésa à Berga)	140	Liége.
Chemin de fer Central de Aragon	302	Bruxelles.
Chemins de fer de Madrid à Cacérès et au Portugal et Ouest de l'Espagne	777	Madrid.
Chemins de fer de Madrid à Saragosse et à Alicante	3 663	Madrid.
Chemins de fer de Medina del Campo à Salamanca	77	Madrid.
Chemins de fer de Medina del Campo à Zamora et de Orense à Vigo	297	Barcelone.
Chemins de fer du Nord de l'Espagne	3 692	Madrid.
Mines et chemins de fer de Utrillas	127	Saragosse.
Great Southern of Spain Railway	168	Aguilas.
UNITED STATES OF AMERICA.		
American Railroad Association	3 218	New York.
Alabama Great Southern Railroad	476	Washington, D. C.
Atlanta & West Point Railroad and the Western Railway of Alabama	352	Atlanta, Ga.
Baltimore & Ohio Railroad	7 170	Baltimore, Md.
Bessemer & Lake Erie Railroad	349	Pittsburgh. Pa.
Central of Georgia Railway	3 083	Savannah, Georgia.
Central Vermont Railway	863	St. Albans, Vt.
Chicago, Peoria & St. Louis Railway	378	Springfield, Ill.
Cincinnati, New Orleans & Texas Pacific Railway	544	Washington, D. C.

NAMES OF THE ADMINISTRATIONS.	Kilometres.	OFFICES.
Delaware & Hudson Company	1 258	New York.
Delaware, Lackawanna & Western Railroad	1 577	New York.
Elgin, Joliet & Eastern Railway	340	Chicago.
Erie Railroad	3 634	New York.
Hocking Valley Railway	552	Richmond, Va.
Illinois Central Railroad	7 725	Chicago.
Lehigh & New England Railroad	325	Philadelphia, Pa.
Lehigh Valley Railroad	2 251	New York.
Long Island Railroad	634	New York.
Mobile & Ohio Railroad	1 490	St. Louis, Mo.
New York Central Railroad Company	5 954	New York.
New York, Chicago & St. Louis Railroad	842	Cleveland.
Norfolk & Western Railway	3 573	Roanoke, Va.
Pennsylvania System	16 949	Philadelphia, Pa.
Pittsburgh, Shawmut & Northern Railroad	338	New York.
Richmond, Fredericksburg & Potomac Railroad	132	Richmond, Va.
St. Louis Southwestern Railway	2 538	St. Louis, Mo.
Southern Railway	10 560	Washington, D. C.
Staten Island Rapid Transit Railway	55	New York.
Ulster & Delaware Railroad	208	Kingston, N. Y.
FRANCE, ALGIERS, TUNIS AND COLONIES.		
a) France.		
I. — *Lines of the State.*		
Chemins de fer de l'Etat	9 002	Paris.
Chemins de fer d'Alsace et de Lorraine	1 969	Strasbourg.
II. — *Main lines.*		
Chemins de fer de Ceinture de Paris	158	Paris.
Chemins de fer de l'Est	5 027	Paris.
Chemins de fer du Midi	4 081	Paris.
Chemins de fer du Nord	3 805	Paris.
Chemins de fer d'Orléans	7 793	Paris.
Chemins de fer de Paris à Lyon et à la Méditerranée	9 795	Paris.

NAMES OF THE ADMINISTRATIONS.	Kilo-metres.	OFFICES.
III. — *Secondary lines.*		
Chemins de fer d'intérêt local de l'Anjou	315	Bordeaux.
Chemins de fer du Beaujolais	91	Villefranche (Rhône).
Chemins de fer du Cambrésis	120	Paris.
Chemin de fer de Chauny à St-Gobain	15	Paris.
Chemins de fer des Côtes du Nord	219	Saint-Brieuc (Côtes du Nord).
Chemins de fer Départementaux	1 427	Paris.
Chemins de fer Départementaux de l'Aisne	200	Paris.
Chemins de fer Départementaux des Bouches du Rhône	175	Arles s/Rhône.
Chemins de fer Départementaux du Tarn	150	Castres s/Agout. (Tarn).
Société générale des chemins de fer Economiques	2 555	Paris.
Chemins de fer Economiques du Nord	365	Paris.
Chemin de fer de l'Est de Lyon	104	Lyon.
Chemins de fer de Grande Banlieue	240	Paris.
Voies ferrées des Landes	363	Paris.
Compagnie Meusienne de chemins de fer	168	Bar-le-Duc.
Chemins de fer de Pau-Oloron-Mauléon et tramways de Bayonne-Biarritz	10	Bayonne (Basses-Pyrénées).
Chemins de fer de Saint-Quentin à Guise	65	Paris.
Chemins de fer d'intérêt local de Saône et Loire	192	Macon (S.-et-L.).
Chemins de fer de Somain à Anzin et à la frontière belge	34	Anzin.
Chemins de fer du Sud de la France	570	Paris.
Chemins de fer du Sud-Ouest	400	Toulouse (Haute-Garonne).
Chemins de fer d'intérêt local de l'Yonne	142	Joigny (Yonne).
Compagnie générale des chemins de fer vicinaux	390	Paris.
Compagnie générale de voies ferrées d'intérêt local	513	Paris.
Régie départementale des tramways de l'Ain	436	Bourg (Ain).
Tramways départementaux des Deux-Sèvres	198	Paris.
Tramways de l'Indre	198	Paris.
b) **Algiers and Tunis.**		
Chemins de fer algériens de l'Etat	2 532	Alger.
Chemins de fer algériens de la Compagnie Paris-Lyon-Méditerranée	513	Paris.

NAMES OF THE ADMINISTRATIONS.	Kilo-metres.	OFFICES.
Chemins de fer de Bône-Guelma et prolongements	1 550	Paris.
Chemin de fer de Gafsa	441	Paris.
c) Colonies and protectorates.		
Isle of Réunion.		
Chemin de fer du Port de la Pointe des Galets	127	Paris.
Senegal.		
Chemin de fer de Dakar à Saint-Louis	264	Paris.
ASIA MINOR.		
Société ottomane du chemin de fer de Damas-Hamah et prolongements	480	Paris.
Chemin de fer Smyrne-Cassaba et prolongement	701	Paris.
THE UNITED KINGDOM, PROTECTORATES, INDIA AND COLONIES.		
a) The United Kingdom.		
I. — *Main Companies.*		
Caledonian Railway	1 793	Glasgow.
Glasgow & South Western Railway	771	Glasgow.
Great Central Railway	1 596	London.
Great Eastern Railway	1 711	London.
Great Northern Railway	1 596	London.
Great Western Railway	4 269	London.
Lancashire and Yorkshire Railway	1 675	Manchester.
London and North Western Railway	3 283	London.
London, Brighton and South Coast Ry.	784	London.
London and South Western Railway	1 664	London.
Midland Railway	2 224	Derby.
Midland Great Western Ry. of Ireland	866	Dublin.
North British Railway	2 218	Edinburgh.
North Eastern Railway	2 828	York.
South Eastern and Chatham Ry.	1 038	London.

NAMES OF THE ADMINISTRATIONS.	Kilometres.	OFFICES.
II. — *Other Railways.*		
Barry Railway	103	Barry.
Cambrian Railways	483	Oswestry.
Cheshire Lines Committee	220	Liverpool.
City and South London Railway	11	London.
Cork, Bandon and South Coast Ry.	151	Cork.
Dublin and South Eastern Railway	251	Dublin.
Furness Railway	275	Barrow-in-Furness.
Great Northern Railway (Ireland)	896	Dublin.
Great North of Scotland Railway	538	Aberdeen.
Great Southern and Western Railway	1 820	Dublin.
Highland Railway	792	Inverness.
Hull and Barnsley Railway	128	Hull.
Isle of Man Railway	74	Douglas.
Kent, Somerset and Shropshire Light Railways Group	153	Tonbridge.
Liverpool Overhead Railway	16	Liverpool.
Londonderry and Lough Swilly and Letterkenny Rys.	161	Londonderry.
Metropolitan Railway	127	London.
Neath and Brecon Railway	64	Neath.
North Staffordshire Railway	325	Stoke-upon-Trent.
Rhondda and Swansea Bay Railway	45	Swansea.
Rhymney Railway	127	Cardiff.
Stratford-on-Avon and Midland Junction Ry.	105	Stratford-on-Avon.
Taff Vale Railway	200	Cardiff.
Tralee and Dingle Railway	60	Tralee.
County Donegal Railways Joint Committee	201	Stranorlar.
Great Central and Midland Joint Committee	63	London.
Great Northern and Great Eastern Joint Committee	198	London.
Midland Rys. and Great Northern Joint Committee	295	Derby.
Midland Rys. (Northern Counties Committee)	423	Belfast.
Railway Clearing House		London.
b) India, protectorates and Colonies.		
I. — *India.*		
Bengal Nagpur Railway	4 338	Calcutta.
Bengal and North Western Railway	3 304	London.

NAMES OF THE ADMINISTRATIONS.	Kilo-metres.	OFFICES.
Bombay, Baroda and Central India Ry.	6 316	London.
Eastern Bengal Railway (State Ry. of India)	2 797	Calcutta.
Great Indian Peninsula Railway	5 023	Bombay.
Madras and Southern Mahratta Ry.	4 873	London.
North Western Railway (State Ry. of India)	8 883	Lahore.
Oudh and Rohilkhand Ry. (State Ry. of India)	2 562	Lucknow.
South Indian Railway	2 980	London.
II. — *South Africa.*		
Nigerian Railway	1 814	Lagos.
South African Railways and Harbours	15 274	Johannesburg.
III. — *Australia*		
New South Wales Government Rys.	8 071	Sydney.
New Zealand Government Railways	4 838	London.
South Australia Government Railways	3 754	Adelaïde.
IV. — *Canada.*		
Grand Trunk Railway	3 003	Montreal.
Quebec Central Railway	446	Sherbrooke, P. Q.
V. — *Malay Peninsula.*		
Federated Malay States Railways	1 613	Kuala Lumpur.
GREECE.		
Chemins de fer de l'Etat hellénique	1 818	Athènes.
Chemins de fer du Nord-Ouest de Grèce	74	Athènes.
Chemins de fer de Thessalie	233	Athènes.
HAÏTI.		
ITALY.		
I. — *Lines of the State.*		
Chemins de fer de l'Etat	16 164	Rome.
II. — *Private lines.*		
Chemins de fer de la Méditerranée	173	Milan.
Chemins de fer du Nord de Milan	238	Milan.

NAMES OF THE ADMINISTRATIONS.	Kilometres.	OFFICES.
Société Emilienne de chemins de fer, tramways et automobiles	120	Modène.
Société Vénitienne pour la construction et l'exploitation de chemins de fer secondaires en Italie	558	Padoue.
Chemins de fer de l'Apennin central	135	Milan.
Chemin de fer Central et tramways du Canavèse	59	Turin.
Chemins de fer de Reggio-Emilia	71	Reggio-Emilia.
Chemins de fer complémentaires de la Sardaigne	697	Cagliari.
Chemins de fer de Suzzara-Ferrara	82	Milan.
Société anonyme des tramways de Lombardie et Romagnes, Réseaux de Brescia-Mantoue-Ostiglia-Desenzano et Forli-Meldola-Forli-Ravenne-Classe	175	Liége.
Société nationale de chemins de fer et de tramways	150	Rome.
Tramways à vapeur piémontais	180	Bruxelles.
Tramways à vapeur et chemins de fer économiques de la province de Pise	41	Pise.
Tramways et chemins de fer économiques de Rome-Milan-Bologne	31	Bruxelles.
Chemin de fer du Tessin	242	Bruxelles.
Société anonyme pour les chemins de fer vicinaux	136	Rome.
Société sicilienne de travaux publics (Chemin de fer « Circum etnea »)	114	Paris.
Société turinoise de tramways et de chemins de fer économiques	76	Turin.
Tramways Vercellesi	112	Vercelli.
Fédération des transports	3 020	Milan.
JAPAN.		
LUXEMBURG.		
Chemins de fer Guillaume-Luxembourg	257	Luxembourg.
Chemins de fer et Minières Prince-Henri	250	Luxembourg.
MEXICO.		
NICARAGUA.		
NORWAY.		
I. — *Lines of the State.*		
Chemins de fer de l'Etat	2 820	Christiania.
II. — *Private line* (large gauge track).		
Chemin de fer de Christiania à Eidsvold	68	Christiania.

NAMES OF THE ADMINISTRATIONS.	Kilometres.	OFFICES.
HOLLAND.		
a) **Continent.**		
I. — *Main lines.*		
Compagnie pour l'exploitation des chemins de fer de l'Etat néerlandais	2 190	Utrecht.
Chemin de fer Hollandais	1 489	Amsterdam.
II. — *Light railways.*		
Tramway à vapeur de Breskens à Maldegem	42	Breskens.
Tramways à vapeur sud-néerlandais	100	Breda.
b) **Colonies.**		
Chemins de fer de l'Etat aux Indes néerlandaises	3 660	Weltevreden.
Société des chemins de fer aux Indes néerlandaises	749	La Haye.
Tramway à vapeur Semarang-Cheribon	390	La Haye.
PARAGUAY.		
PERU.		
Lima Railways	32	London.
POLAND.		
PORTUGAL.		
a) **Continent.**		
I. — *Lines of the State.*		
Chemins de fer de l'Etat	1 329	Lisbonne.
II. — *Private lines.*		
Chemins de fer portugais de la Beira-Alta	253	Paris.
Compagnie des chemins de fer portugais	1 073	Lisbonne.
Compagnie nationale des chemins de fer portugais	185	Lisbonne.
b) **Colonies.**		
Chemins de fer de l'Etat	1 049	Lisbonne.

NAMES OF THE ADMINISTRATIONS.	Kilometres.	OFFICES.
RUMANIA.		
Chemins de fer de l'Etat	10 258	Bucarest.
SALVADOR.		
Salvador Railway	161	London.
KINGDOM OF SERVIANS, CROATIANS AND SLOVENISH.		
Chemins de fer de l'Etat	1 591	Belgrade.
SIAM.		
SWEDEN.		
I. — *Lines of the State.*		
Chemins de fer de l'Etat	5 582	Stockholm.
II. — *Private lines.*		
Chemin de fer Bergslagen	552	Göteborg.
Chemin de fer Blekinge Kustbanor	168	Ronneby.
Chemin de fer de Frövi-Ludvika et Banghammar-Kloten . .	98	Kopparberg.
Chemin de fer Gefle-Dala	293	Gefle.
Chemin de fer Halmstad-Nässjö	411	Halmstad.
Chemin de fer Kalmar-Nya	195	Kalmar.
Chemin de fer Karlstad - Munkfors - Nordmarks - Klarelfvens-Filipstads - Norra - Bergslagen	171	Hagfors.
Chemin de fer Mellersta-Oestergötland	125	Linköping.
Chemin de fer Nässjö-Oskarshamn	148	Eksjö.
Chemin de fer Nora-Bergslagen	173	Nora.
Chemin de fer Nora-Oestergoetland	134	Finspong.
Chemin de fer Norrköping-Söderköping Vikbolandet	102	Norrköping.
Chemin de fer Norsholm-Westervik-Hultsfred	245	Westervik.
Chemin de fer Stockholm-Roslag	200	Stockholm.
Chemin de fer Stockholm-Vesteras-Bergslagen	479	Stockholm.
Chemin de fer Uddevalla-Venersborg-Herrljunga	92	Venersborg.
Chemin de fer Västergotland-Göteborg	365	Göteborg.
SWITZERLAND.		
I. — *Standard gauge-track railways.*		
Chemins de fer fédéraux	2 906	Berne.
Chemins de fer des Alpes Bernoises Berne-Loetschberg-Simplon	253	Berne.

NAMES OF THE ADMINISTRATIONS.	Kilometres.	OFFICES.
II. — *Narrow gauge-track railways.*		
Chemin de fer de la vallée de Birsig	17	Bâle.
Chemin de fer Rhétique	276	Chur.
Chemin de fer de Viège à Zermatt	35	Lausanne.
Chemin de fer d'Yverdon à Sainte-Croix	25	Yverdon.
Chemin de fer de Lausanne à Ouchy	2	Lausanne.
CZECHO-SLOVAKIA.		
Chemins de fer de l'Etat	12 402	Prague.
Aussig-Teplitzer Eisenbahn	346	Teplitz-Schönau.
URUGUAY.		
Central Uruguay Railway of Montevideo	1 577	London.

[656 .25]

REPORT N°. 2

(all countries, except America)

ON THE QUESTION OF NET COST; RATES (SUBJECT XIII FOR DISCUSSION AT THE NINTH CONGRESS OF THE INTERNATIONAL RAILWAY ASSOCIATION), (1)

By Mr. HENRY-GRÉARD,

TRAFFIC SUPERINTENDENT OF THE PARIS-ORLÉANS RAILWAY COMPANY

Nearly all merchants or manufacturers endeavour to ascertain their net costs. Merchants regulate their selling prices on their buying prices increased by any reasonable costs and the profit which they intend to realise. Manufacturers have to know the cost of raw materials, of the manual labour or the general charges which are entailed in their productions. The simplicity of the calculations doubtless depends on the number or the variety of the products. A mine which always yields a mineral of the same quality, a foundry which turns out the same class of castings can ascertain at once from their figures the necessary data; on the contrary, workshops undertaking repairs or constructing engines of several types must go to greater trouble. Even then it is fairly easy to total up the cost of labour, or estimate at least roughly, that of machining so that one may ascertain quickly and without appreciable error the cost at which an article may be sold without occasioning loss.

Railway companies produce and sell the means of transport. Their operations, although of a general kind, vary considerably in character and importance. The transport of a 20-ton wagon per kilometre, of a parcel post package, or of an ordinary passenger represent very different costs. On the other hand, the conditions affecting such transport are very varied. To haul a wagon of coal up a gradient of 30 per mil requires more power than to do so on a gradient of 5 per mil. The passenger mile costs more in a fast « train-de-luxe » than in the third class of an ordinary slow train, etc. The example set by other industries should lead to the analysis of each of these groups and conditions of transport, and to arrive at the net cost and to then use this figure in fixing the rates charged to the public. To consider why this theoretical conception has not been put into practice by the majority of railway companies and why the latter have not adopted these methods, whether it be by reason of the uncertainty of the results or of the impossibility of turning them to account, also to what extent it would be advantageous to carry the investigations further, is the object of the present paper.

(1) This question runs as follows : » Determination of the net cost of carriage (passengers and goods), taking capital charges into consideration. Its relation to rates charged. »

I. — Ascertaining net cost.

However diverse may be the official classification, traffic in every country can be classified into three principal groups :

1° Passenger Traffic;
2° Traffic comprising fast train merchandise, perishables, and the postal services;
3° Slow freight traffic comprising all goods at tonnage rates and certain special classes, such as live stock, vehicles, etc.

The simplest definition, the statistical definition, if one may say so, of net cost, should consist of calculating from the known gross amount of expenditure the proportion to be allocated to these three principal groups in such a manner that the balance for each section will show separately the earnings and expenditure. These comparisons can be carried further by sub-distributions, so as to divide the net cost between the various classes of passengers and the different kinds of goods.

The answers from the various administrations consulted show that up to the present none of them has been requested to get out statistics which would clearly show the results suggested above. With regard to this, it is interesting to note to what extent the countries concerned (European countries, except German speaking people and English speaking people outside the United States) have failed to notice the continual efforts made in America to ascertain from the net costs an authentic base for estimating the profits realised by the companies from each kind of traffic, and the minimum rates deducible therefrom. The enquiry into net costs has received no official recognition anywhere. It has had no tendency to become a means of control, and has remained as the work of private individuals of certain railways and of a few experts. On the whole it is a question that has never been thoroughly studied.

General principles. — The International Railway Congress, however, dealt with this question in its third session held in Paris in 1889 in a paper by M. Amiot, Chief Engineer to the Paris-Lyons-Mediterranean Railway Company, dealing with the « Net cost of the units of transport » (1), but the author and the Congress had been guided less by the anxiety to compare the net costs of one traffic with another than by the desire to find statistical formulae, the general adoption of which would allow for a comparison of the economy of working two lines belonging to the same system or to very different systems. These formulae were functions of the traffic density and of the average gradients. They were based, nevertheless, upon a certain number of assumptions of which the author had personally ascertained the accuracy on the Paris-Lyons-Mediterranean Railway. M. Amiot particularly brought out that slow freight ton-mileage cost the same as the passenger-mileage, and he assumed that the gross ton-mileage hauled (tare of wagons plus load) could be reduced to a common denomination by taking 0.7 for the units of freight trains, and 1.3 for the units of passenger trains. These assumptions appear, as we shall show further on, very questionable.

The question has been taken up by

(1) See *Bulletin du Congrès des chemins de fer*, June 1889 number, page 498, and *Proceedings of the third session* (Paris, 1889), 3rd volume, p. XXIII-3.

M. Pereire in his « Essay on a method of railway accounting ». The author, who takes for his starting point the working results of the Est Railway Company, lays down the following rules :

1° The expenditure represented by the capital charges (shares or debentures) is proportional to the gross ton-mileage.

2° The permanent way expenses are proportional to the mileage of the trains;

3° Train working expenses are in proportion to the gross ton miles but affected by a factor dependent on whether it is fast or slow train traffic;

4° Traffic expenses, general charges, maintenance of buildings are proportional to the consignment mileage, *i. e.*, the product of each consignment with its corresponding length of journey.

It is difficult to agree to this last rule. If it is true that the charges of the systems grow with the splitting up of the consignments, their number and their mileage are not the only measure of the work of the stations, and it is impossible to ignore the tonnage. The handling of a wagon load of corn in sacks requires assuredly more labour than that involved in the delivery of a small package or the carrying of a passenger. It is absurd to attach the same importance to each of these operations. It is equally so — notwithstanding the expenses of transhipment or break of journey — to suppose that the transport of goods or of a passenger a distance of 100 km. (62 miles) costs in working charges twice that incurred for a distance of 50 km. (31 miles). Too great a share given to registrations and to mileage has the inevitable consequence of putting a deficit on the fast goods traffic in which the distances are the longest and the consignments most varied; and it is indeed to this conclusion that the author arrives in finding a cost of 77 to 81 c. for the fast goods ton-mileage when the average receipts do not exceed 20 c. upon the Est Railway system (Pre-war figures).

On the other hand, the accuracy of rules of such a general character can only be looked upon, for this reason, with suspicion, or at the most as a rough approximation. Taking the whole of the expenses of each service, there are some which depend clearly on actual figures, *e. g.*, the cost of construction and repair of rolling stock (wagons, coaches, and even locomotives), the cost of lighting passenger trains, etc. To assume that between these headings, which can be picked out, that a sort of compensation occurs justifying the allocation of a lump sum proportional to a mileage factor (tonnage, wagon miles, train miles, consignments, etc.), is nothing more than an assumption.

This is the complaint made against all simplified formulae by certain administrations and who content themselves with this criticism when dealing with our request for determining the apportionment of expenses as between fast and slow train traffic.

The Paris-Lyons-Mediterranean Company for instance relies to a certain extent on the assumption that the cost of a train mile is the same for fast as for slow train traffic, but admits that the basis is an arbitrary one. The Italian State Railways have forwarded to us a report on the subject by Mr. Engineer Serani. The author has gone very fully into the question of the net cost of the ton-mileage for freight and that of passengers of different classes. From a comparison which he made with the corresponding receipts, he draws interesting conclusions, but his calculations depend essen-

tially on the unit of value of the cost per axle-mile for all traffics or the sub-divisions of a single traffic, and it would require confirmation.

The diversity of the theories put forth in regard to these investigations, some of which we have mentioned, is the best proof of their uncertainty. It is, moreover, easy to show that they are far from leading to identical or even approximate results, and it is sufficiently convincing to compare on the same railway or between any railways taken at random, the ratios of the data of fast and slow traffic likely to affect these allocations. This is shown in the following table :

—	Ratios in (1913)*				
	of the number of passenger-miles to the number of net ton-miles slow trains.	of the number of train-miles fast trains to the number of train-miles slow trains.	of the number of wagon-miles fast trains to the number of wagon-miles slow trains	of the gross ton-miles fast trains to the gross ton-miles slow trains.	of the total receipts fast trains to the total receipts slow trains.
Swiss Federal Railways . .	...	0.42	0.94	...	0.89
Swedish State Railways . .	0.63	1.89	0.45	0.51	0.50
Portuguese Railways. . .	0.67	3.28	0.50	...	1.07
Paris-Lyons-Mediterranean Company (France) . . .	0.66	1.83	0.55	0.74	0.71
Paris-Orleans Company (France)	0.89	1.80	0.41	0.81	0.88

(*) These figures can only give a relative idea as to the magnitude the differences which exist between the statistics of the various countries preventing any absolute value being attributed to them. Particularly mixed trains (goods-passenger) are sometimes reckoned with fast trains and sometimes with slow goods trains. The French railway companies count the wagon and not the axle-mileage, as is the practice on certain foreign railways. Finally, it should be pointed out that the ton-mileage of fast trains has not been converted into terms of passenger-mileage, and consequently the fast train miscellaneous traffic (miscellaneous merchandise, perishables, etc.), does not figure in the first column, though it is included in the four others

One may observe the extent of variation between which it possible to go according to the choice of one or other of these elements as a unit of cost, or according to the importance accorded to them in their distribution in the formulae. On the Paris-Lyons-Mediterranean Company for instance, the train mile unit would fall three times heavier on the fast train traffic than the assimilation of passengers with the slow train ton-mile, and the margin between the gross ton mile and the wagon-mile figures is nearly 40 %.

A rough proportional formula, whenever it may be, applied to all heads of expenditure of one company or of all companies, contains such an element of error that this inaccuracy should encourage the search for a true net cost.

Can we not by a more complete analysis of each individual case arrive at something nearer the truth so that the results may be of some value?

The difficulty of computing net cost in railway work is due to the fact that with plant and operating resources used in common for all traffics, very different

operations are carried out. The lines and the structures on them are used indifferently for both fast and slow traffic. The same staff at the stations, *e. g.*, the signalmen or telegraph operators, insure the movement of passenger, miscellaneous merchandise, and freight trains, etc. The question arises whether it is possible to successively take into consideration each of the items of expenditure and distinguish between :

a) Those which may be placed at once in one or the other class of traffic;

b) Those which more indirectly, but fairly certainly, are capable of being investigated by taking a sufficient number of concrete cases;

c) Those in which data of the kind is wanting are only capable of being estimated in the way thought best.

It was in this sense that the detailed list of questions, forwarded to the administrations, dealt with in the present report was prepared. Some of them (Danish State, the majority of English speaking countries) have replied that, even put forward, in this way, finding the net cost appeared to them of too uncertain a nature to warrant them following it up. Others (Swiss, Norwegian, etc.) admit that the proposed method was praticable and sufficiently reliable in its results, but they have not been in a position to give it a trial on their respective lines. The number of those railway companies is very small (Swedish State, Portuguese Railway Company, French Nord, Orleans Company, Transcaucasian Company), who have gone into the calculations asked for fairly thoroughly in order to find out for themselves the objections or results which they might lead to.

We apologise therefore for having to give in the following notes, conclusions derived from personal experience.

Analysis of expenditure. — All railway systems distinguish in their accounts between : 1° the working expenditure which is, like the receipts, in direct proportion to the traffic; 2° capital expenses (construction of the line, construction or acquisition of rolling stock, new constructions or extensions) represented by the share capital and stock of which the annual charges for interest and sinking fund are carried to the debit of each working period.

1° Operating expenditure. — The expenses of the first group fall between :

a) *Operating*, comprising everything which relates to station working proper and to train staff;

b) *Locomotive power and Rolling stock;*

c) *The Permanent Way and Buildings;*

d) *The General Management* and the administrative departments connected therewith (Law charges, Accountancy, etc.).

a) *Operating.* — It is possible to directly allocate the greater part of these costs between the fast and slow traffic. The allocation is automatic as regards some of them (compensation for loss, delays or damage, — cost of advertising and tickets — heating and lighting of trains, — cost and maintenance of sheets, loose fittings, etc.). It can be arrived at more laboriously perhaps, but with sufficient exactitude by a detailed examination of the other headings. Take for instance Station Shunting. The returns do not separate the items relative to the making up of fast or slow freight trains. It is, however, a simple matter in each of the principal stations, where

the two kinds of traffic are carried on simultaneously, to calculate the expenditure chargeable to each of them, and the error is not so great but that the coefficients found can be applied to the remainder of the system, seeing that the greater part of the total cost of shunting is in connection with these stations. Consider also the salaries and wages of the station staffs. A dissection of the pay sheets enables us to pick out the staff employed in connection with either fast or slow traffic, or for « General service » (Supervision, pointsmen, lampmen, telegraph operators, etc.) who have to deal with the running of all trains, and who ought to be logically attached to each of the two kinds of traffic in the proportion of fast and slow freight train-mileage. It is true that in many of the smaller stations this triple distinction is much less definite, but if a sufficiently large number of the principal or average sized stations have been taken as a base in these first trials, we should not be far from the truth in applying to the whole system the coefficient arrived at (1).

b) *Motive power and Rolling stock.* — The separation of the costs of traction and rolling stock would have the accuracy of a known quantity if the rolling stock was exclusively used for a particular traffic. This is the case with passenger coaches and to a large extent with slow freight wagons (some of which however are used concurrently with luggage vans in the formation of trains for merchandise at fast train rates). The same applies to a fairly large number of engines, which according to their type are limited to passenger or goods trains. Of late it has been the custom to build powerful locomotives which may be used irrespectively for either kinds of traffic, and the same practice has been applied in the case of drivers and firemen. From this arises the necessity of calculating the miles which are debitable for these engines and mixed staff to slow as well as fast traffic, and to distribute afterwards proportionately to this mileage the wages, premiums, cost of fuel and other items, and repairs at depôts and workshops. The work is sufficiently complicated, but it can be done and might only be tried for a few months. Once calculated, it furnishes a logical basis for allocating the costs of traction.

c) *Permanent Way and Buildings.* — It is not possible to deal in this way with the permanent way expenses. Every method of directly classifying the costs, with rare exceptions (*e. g.*, for buildings), has been found defective, and the examination of the accounts leave a wide margin for their interpretation.

Among permanent way expenses there are some which are independent, not only of the class, but of the density of the traffic; for instance the maintenance of stone bridges, iron superstructures, signals, supervision even, of the less frequented lines, are only factors in regard to deterioration from age or atmospheric action, or of a minimum maintenance which does not vary according to the number of trains run. On the contrary, other heads of expense, such as materials and labour for upkeep, clearly grow with the increase of traffic.

The permanent way expenses may therefore be represented by the following formula :

$$V = a + bT$$

(1) For example, on the Orleans Company, 80 °/₀ of the salaries and wages have been thus distributed among the employees of the stations. The ratio has been applied to the remaining 20 °/₀ of these costs.

where *a* and *b* are two constants, and T the traffic.

The mathematical value of T is, however, difficult to determine. The wear of the track depends on the frequency and the speed of trains, on the type and power of the engines, and on the type and weight of the wagons used on the line. You might as well say what becomes of the data : train-mileage (or engine-mileage), wagon-mileage (or axle-mileage), and gross ton-mileage. To omit the train-mileage is to neglect the speed and destructive action of fast trains. If the wagon or the axle-mileage, apart from the tonnage, is not taken into consideration, the assumption is that the individual load on an axle has no effect, and that empty freight trains of 80 wagons weighing 640 tons will wear away four times as much of the line, sleepers and connections, as a train of 20 full wagons of coal of the same weight.

It is not possible to combine these various quantities in the same formula, without attributing to them coefficients which would not be less arbitrary than the exclusive choice of one of them. It will certainly be very interesting if more thorough researches contribute to throw more light on the question by gathering together a sufficient number of observations from practical experience. Even then they could only have a limited range. What is true for one line may not be so for another, as the slackness or density of traffic react differently on the respective data under consideration.

If it is necessary, however, to decide upon a general basis of distribution, the preference of the majority of the railway systems inclines, rightly we think, to train-mileage. The increasing use of heavy engines tends to greater wear of the track, and one must have some regard for greater speed of passenger trains although their weight is not so great (1).

d) General management and cost of administration. — A certain number of the expenses that come under this heading (allocations for sickness, benevolent funds, superrannuation, etc.) have to do with the staff and should follow the salaries and wages. The remaining costs of general administration may be charged in proportion to the coefficients of distribution found for the whole of the working expenditure of the railway.

The brief account which we have given does not pretend in any way to determine formulae. Its only object is to indicate the possibilities of a way which would take the place of assumptions, which are often guess work, of a method based on the analytical examination of the facts. Doubtless it is very rare that the figure, whether of statistics or accounts, gives direct information, but there is a means of throwing light on the subject by means of statistical analysis and getting information from the service, and the more these are gone into — at the cost of an investigation which is bound to be somewhat long — the more will be the chance of fixing an approximate figure. The permanent way expenses are the only ones which cannot be readily dealt with.

This method of investigation having been applied by the Orleans Railway Company, acting on pre-war data, enabled them to estimate that on their system, the slow freight train-mileage cost for working and traction nearly double that for the fast freight train-mileage — that the total net cost (for the whole service) of the fast train-mileage is less by 40 %

(1) It is also the most reasonable basis for allocating the costs of the fixed signals.

than that for the slow freight train — that the cost of the gross ton-mileage is 25 % less with slow freight train than with fast train — and that the whole of the costs of fast traffic is more than half the total expenditure, although the corresponding proportion of the receipts for this period was only 45.3%. Similar results have been obtained on another French railway.

2° Capital expenditure. — This expenditure looked at from this point of view falls into three principal groups :

a) Purchase or construction of rolling stock;

b) Extensions due to the increase of traffic;

c) Construction of the permanent way, buildings, etc.

The capital charges in respect of rolling stock can be allocated in the same way as its maintenance and use, a direct charge can be made for engines or vehicles doing particular work, and where the work is general, the charges should be pro rata to the train-mileage for each service.

The second group of constructive works, called (at least in France) « supplementary works », have been constructed for a clearly defined purpose; such as the extensions of sorting yards, the renewal of goods and passenger stations, the construction of workshops, the doubling of the track in the outskirts of large towns. The examination of the annual accounts and tables enables one to distinguish which of these works belongs exclusively to one or the other kind of traffic, and those which, having a common use, should be allocated in a way which is usually easy to ascertain. It is essential, however, that this process of dissection should cover a sufficiently long period (1). The requirements in respect of increased traffic are in fact as unequal as its developments; constructional work does not always follow a regular course, and the exceptional importance of some of it would, for some financial periods, completely upset the average.

Finally, we have the expenditure in the third group, *e. g.*, that of the construction of the line. For the bulk (one could if necessary leave out certain stations or buildings) the difficulty is the same as for the costs of maintaining the track. The road bed, sleepers and rails, do not belong to any particular traffic. On what basis shall they be determined?

Wagon-mileage, train-mileage, net or gross ton-mileage, etc., it was natural that the formulae already examined should apply in this case. Without going into a general discussion, three only can be considered.

Certain companies propose to split up the charges on capital in proportion to the coefficients obtained in the apportionment of the working expenditure. In reality, this solution is only a make shift inspired by an altogether superficial analogy. The relation is of the remotest between these very variable elements, such as manual labour or raw material, which are comprised in the working expenditure, and the capital spent in the construction of a line in view of an unknown amount of traffic.

We should be more disposed to find in the gross ton-mileage the indication of the portion of the capital charges which

(1) The Orleans Railway Company took a period of twenty years considering only costs exceeding 100000 fr. It was thus possible to directly allocate a sum of 216 millions out of a total of 269 millions.

ought to be allocated to the one or other kind of traffic. In the same way that certain machines do not directly work the material which they deal with, likewise there enters between the fixed equipment af a railway and its final production (passenger or net ton-mileage) a necessary intermediary which takes its part more or less in the work done to produce the final results. The best measure of this intermediary is the gross ton-mileage, and it is this figure which appears to best represent the value of the utilisation of the line when once set up.

A third idea, equally defensible, remains to be mentioned : it is illusory to seek, even approximately, for a basis on which to allocate this capital. Let us confine ourselves to settling net cost in terms of less uncertain data; working expenditure, cost of rolling stock, supplementary works. In arriving at the receipt per mile for passengers or goods, begin by deducting from the total receipts for each of these traffics a portion of the annual charges in connection with the costs of construction calculated in proportion to the receipts from passengers and goods respectively. This is an attempt to make, under another form, each traffic pay its share in terms of its receipts.

To sum up, there is nothing to prevent the direct analytical procedure as advocated in respect of the working expenditure, but with greater difficulty perhaps, still finding a use in the examination and allocation of the capital charges. All that is necessary then will be to unite these two items so as to ascertain the total share of each traffic.

We cannot pretend by this method to obtain the exact mathematical value of the net cost of fast traffic and slow freight traffic, but a relative value of what each costs, enabling us at least to judge if there is a net profit or not. The Orleans Railway Company, which has a low passenger density, especially in the 1st and 2nd classes, has followed up the enquiry of the net cost on these lines, and has come to the conclusion that the slow freight traffic alone left a margin of profit, whilst the fast traffic (passengers and goods) showed a deficit.

It would be desirable to push this enquiry further and ascertain if it is the transport of passengers or merchandise at fast train rates which is responsible for this deficiency, or what share in the net profit they contribute if there be one; we are also inclined to ask how the net costs per passenger-mile from the 1st to the 3rd classes are graduated. The nature of this report does not allow us to give the method of doing this work. It is also evident *a priori* that in these sub-divisions of costs the same problems will be found, and the same possibilities of solving them, as in the more general splitting up from which we started. It would not be very difficult for instance to separate, in the more important stations, the expenses relating specially to the receipts from tickets and to the offices dealing with other traffic carried by fast trains; the costs for lighting and heating of passenger trains, and the costs of construction and maintenance of each class of passenger coach would be exactly known. A division of the costs for conveyance should be arranged between passengers and merchandise at fast train rates in proportion to the gross ton-mileage, and the charge for maintenance of the permanent way in proportion to the vehicle-mileage of each class, and if as a result of these various enquiries there is a risk of increasing the degree of uncertainty or error to which some of them

may lead, it seems nevertheless that the figures finally arrived at should be as in the first case sufficiently approximate to be valuable as a guide.

II. — Various aspects of net cost. — Effects from the point of view of fixing rates.

We have tried to establish :

1° That it would be useless and even dangerous to endeavour by general formulae to calculate net costs;

2° That only direct methods of investigation applied by each system with the data and the means at its disposal are capable of giving an acceptable approximation;

3° That even these methods are of no use for certain headings of expenditure, which are few, but important, the division of which will have to be estimated on a basis which it is desirable should be common to all railways.

We have been particular as to the degree of accuracy in these results, and of their application to the general layout and traffic of each system. It is all the more necessary to guard against generalising in these matters when judging by differences; the profits of railways are nearly always small in proportion to total expenses or the charges which they have to bear. It is inevitable in considering the net proceeds of each class of traffic that the beam of the balance should be nearly in a position of equilibrium : and small variations in allocating are enough to transform any profit into an apparent deficit or vice versa.

With these reservations, what are the lessons to be drawn from net cost as we have defined it? It depends on averages and relates to the costs of traffic carried. This double point of view dominates the interpretation that can be obtained from it. In place of a single balance of profit and loss of which the data composing and explaining it are unknown, it gives an idea of the financial results of working each large section of the transport service.

It is a better guide to the consideration of an increase or to the possibilities of reduction of the average rates. When, after a sudden increase of costs like that which followed the war, a general increase of receipts is obligatory, an idea of the average net cost would contribute to fix, through having a better knowledge of the subject, the respective percentages which will be necessary to apply to each class of traffic. Up to a certain point it would enable a judgment to be made as to what difference there should be between fast and slow train traffic. Finally, it would help to ascertain whether, in the three classes for passengers, the relation of the receipts agrees with the difference in their costs.

More, however, should not be asked. It would be particularly absurd to affirm — especially with the very varied commodities carried by slow freight trains — that the net cost shews the minimum below which the basis of any schedule ought not to fall. The average represented by these figures results from a mass of goods more or less profitable to be carried on lines sometimes hilly and sometimes flat and easy to work, and one must not leave out of account the economy of engine mileage resulting from long hauls, and which explains why certain rates diminish according to distance. A minimum based in this way would be absolutely misleading.

For the same reason, and however

closely one may try to fix these values, it would not be possible to adjust the average rate per mile for each class of traffic on the corresponding net cost. It would be fantastical, as we have seen, to establish on a given railway the exact schedule for the carriage of retail coal or of perishable goods. If we succeeded in doing it, this would only be so much lost labour, because (the answers of the administrations consulted are unanimous on this point) the net cost is not and never will be the only factor regulating the fixing of rates.

Many other factors intervene. Firstly, the value of the goods. The haulage of a full wagon of cotton and a full wagon of coal costs the same, but they are, however, never charged at the same rate. The difference does not only pay for the margin which separates the insurance premiums of two unequal values in case of danger or loss, but is intended chiefly to help those traffics which are incapable of supporting very heavy charges, the profits from the carriage obtained on goods which may be more heavily rated.

On the other hand, a unit for tariffs is incompatible if net cost is exclusively taken into account. The coal field of the Pas-de-Calais and that of Auvergne send their products away with transport costs that are certainly different. They should, however, apply the same tariffs. Carrying a passenger in a flat country and in a mountainous region does not cost the same, yet they both pay the same rates. Even as far as special schedules and fixed charges are concerned, where these are applied, these are most frequently fixed for other reasons than that of the physical geography of the line.

The rating is in fact arranged in each country by many other considerations than that of net cost. It is the competition of the waterways which, in order to keep the traffic, brings the rates low in certain cases or for certain kinds of goods; it is the necessity to favour the development of an industry or a new flow of traffic by opportune concessions, or widening the zone of penetration of some raw material. It is the facility that is desirable to accord to through or export traffic; it is in a general way, the necessity of acting with sufficient suppleness so as to model a system of tariffs based on the economic conditions of the various regions that have to be worked in place of making it a simple expression of a series of costs.

Does it follow that the actual tariffs do not bear the impress of the net cost ? Anything to the contrary would be surprising. The surtax applied to cumbersome or particularly fragile goods has no other justification than an increased cost in loading it, utilisation of stock or the risks of having to pay compensation, the costs of shunting invoiced to private sidings are based on an estimate of the corresponding costs. The consignment of a fully loaded wagon of 20 tons is rated less than that of packages subject to many transhipments, and if reductions are generally accorded to a number of batches of trucks sent at the same time and to the same destination it is because these batches decrease the amount of station work. Proceeding in this direction, the recent slow freight tariff 29 of the French railways has conceded allowances to the senders who make up and deliver complete trains for which the undetermined charge is settled according to the circumstances concerned.

Those are examples which it is easy to multiply, where the net cost has suggested — at least qualitatively — the rate charged. It is possible to even find

cases, though not very numerous, where its approximate valuation has served as the basis for contracts or for transactions with the public administrations : such as the code of rules arranged with the Post Office, or in France the last modification to the « Cotelle » Agreement, which, in order to fix the increased charges to be added to the registered rates in the initial convention, started from an allocation of the respective costs for the military and commercial transports (1).

Outside these particular circumstances or this secondary role, can the net cost not help us more directly in the study of tariffs? Perhaps, but on the condition of first modifying the definition previously given.

In these matters we always come back to the same problem : how to produce a result by means of tariffs on the traffic? A reduction or a new schedule is capable of enlarging the area for carrying raw materials a greater distance, of attracting passengers who would not otherwise travel. A final increase in the receipts is anticipated, notwithstanding the lowering of the unit price, but will it cover the new expenses brought about by this extra traffic? It may be seen how much in this case we deviate from the average net cost. It is no longer a question of dissecting a total known expenditure, but of finding out what relations exist between the growth of this cost and the growth of the traffic. This is the well known distinction between the total net cost and the partial net cost.

The conception of a partial net cost has often been criticised, and it is certain that to interpret it too broadly we run the risk of coming to unwarranted conclusions. A railway system rarely operates to the full utilisation of its plant, if only on account of the annual and seasonal variation of traffic. It follows that the effect of a change of traffic is not noticed immediately. The number of passengers may increase without at first having to add additional trains; the despatch of a 20-ton wagon increases the gross ton-mileage to be hauled, but it will be necessary for these consignments to grow before rendering the wagon stock or sorting sidings inadequate. It would be, however, unwise to neglect this delayed effect and only calculate by means of the partial net cost the expenditure immediately felt. It would be wrong to consider, for instance, the costs of haulage of the additional ton, and to elimate its more or less remote effect on the development of supplementary works; by doing so one would immoderately reduce the estimate of its cost.

It is easy to avoid this obstacle by using the same method as in the determination of the average net cost, and successively examining each head of working costs, or the capital charges, and in striving to find out either by direct experiment, or by taking several years, and seeing how each of them varies with the progression in passengers and goods. For example, if we compare over a period of 20 years supplementary works that have been installed for slow traffic (1) with the increase of the net

(1) To fix the net cost of military transports, only a fraction of the total expenses have been taken proportion l to the ratio of the receipts of the military traffic, to the total of the military and commercial receipts. There is no need to insist on the contractual nature of this rule.

(1) On the supposition that the allocation charges or the costs between the fast traffic and slow freight traffic is made, as already stated in heading I, § 2, Capital invested in the construction of the line.

ton-mileage during the same period, the ratio of these two figures will give an approximate idea of the capital employed for each ton of new traffic.

We do not think it is necessary to enter into details of this examination. The appendix to the present report recapitulates one of the numerous methods which can be attempted in this sense. It is sufficient to observe here, in a general way, among the costs :

a) Some are directly proportional to the development of the traffic : thus the costs of rolling stock and haulage (1) increase nearly in proportion to the gross ton-mileage;

b) Others are distinctly and absolutely independent of the traffic : such is the case with the capital invested in the construction of the line;

c) Others again increase with this traffic, but at a less rate. We will give only one example. It has been shown above (Heading I, § c; Permanent Way and Buildings) how the costs of the permanent way can be put in a formula of two terms, of which one is a constant not subject to the frequency of the train movements, the other a function of the mileage and the speed of the trains. The first is set aside here, whilst the second is easily determined empirically by the successive examination of the corresponding costs for the sections affected by slow trains only, or slow trains and express trains, or slow trains, fast trains and express trains. The Orleans Railway Company, where the work was carried out, estimated that, before the war, the additional train-mileage cost the permanent way :

0.10 for slow trains;
0.15 for express trains (and 0.20 on mountain lines);
0.30 for trains whose speed exceeded 75 kilometres (46.6 miles) per hour.

Under this form and with the reservation already mentioned, the partial net cost may not be a decisive factor, but a useful factor for consideration in the detail of fixing rates. It will serve as counter part to the receipts in estimating the profit to be obtained by an application of tariffs; it will give the lowest rate of new traffic, about which it is necessary to be certain, to ensure that there is no loss. The value of its indication will offer a guarantee so much the greater as the investigation will take place on clearly defined lines of enquiry, instead of being confined to generalities.

These lines of enquiry are numerous, and include questions relating to the general working, as well as the question of rates and charges. There is a benefit, for example, in endeavouring to find out what it costs, directly and indirectly, on certain selected sections of the line for the running of a shuttle service with trains returning empty to where they are loaded. Even in the arranging of fresh trains, to decide whether a train shall be put on or its make up, one is led to ask : what will the cost be ? How many new passengers of each class it ought to carry so as to pay its way? These valuations are, in spite of some uncertainty, sufficiently easy to set up (1), they are evidently mixed with many other considera-

(1) It would be necessary at the present time to multiply these figures by 4 at the least.

(1) On the Orleans Railway Company schedules have been arranged to deal with investigations of this kind.

tions which may in the final solution carry more weight, but such as they are, they throw a light on this matter. It is on this account that the investigation of partial net cost is useful, which cannot be expected from the average net cost.

III. — Conclusions.

From the preceding report we may put forward the following conclusions :

1° The splitting up of the total working costs and capital charges between the different classes of traffic is possible, assuming that each item of expenditure is analysed, and where necessary examining concrete cases;

2° The difficulty of allocating certain costs to each class of traffic, even in these circumstances, prevents the results being absolutely accurate, but permits of information being obtained respecting the relative net proceeds of each traffic;

3° The cost price neither is nor can be on any railway the determining factor in making rates, but it is a useful element in the investigations connected therewith. When such investigations are directed to the development of traffic through a modification in rates, in considering the questions, the cost price in relation to the traffic actually carried, should not solely be taken into consideration, but the partial cost price from which the expenses independent of the density of the traffic are excluded.

APPENDIX.

Ascertainment of partial net cost per slow freight ton-mile, or fast train-mile.

A systematic examination at the principal stations, will indicate what it costs on an average :

a) Clerical work per 100 consignments fast trains, and 100 consignments slow freight trains;

b) The handling of one ton by fast train and one ton by slow freight train;

c) The transhipment of one ton by fast or slow freight train respectively at Transhipping Stations;

d) The shunting of a wagon in the sorting yards (this includes the shunting staff, pointsmen, and locomotive charges);

e) Formation of trains for despatch, and the breaking up of a train on arrival for the average fast service (staff and shunting engines);

f) The despatch of 100 passengers with their luggage (tickets, registration, handling of baggage, supervision, etc.);

g) On the other hand, is calculated from the greatest possible number of different relations, the average mileage of each vehicle between two successive shunting operations;

h) The average mileage per ton slow freight (mixed goods) or per ton by fast freight between two successive transhipments;

i) Having distributed the costs in respect of supplementary works for the later years (1) between the fast trains and slow freight trains, it suffices to compare the slow freight costs with the increase of the slow freight ton-mileage in the same period to get the value of these costs per ton mile;

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(1) Going back at least twenty years.

j) A similar calculation gives the costs of the same kind relating to the fast freight ton-mile;

k) Knowing the average annual mileage, the annual sinking fund charge for an engine of the current type is found, first for slow freight train-mile, then for slow freight ton-mile, taking account of the average net tonnage of each train.

The same procedure gives the sinking fund charges to be calculated;

m) Per engine for the fast freight train-mile;

n) Per slow freight wagon-mile, in terms of the mileage and the average cost of these vehicles;

q) Per fast train wagon-mile, under the same conditions.

With these data, the net cost of the slow freight ton-mile and the fast freight train-mile can be calculated as follows :

I. — Net cost of the slow freight ton-mile.

Working costs. — Taking the sum of the slow freight data:

$$\frac{2\frac{a}{100} + 2b + c \times \frac{p}{h} + \frac{d}{t} \times \frac{p}{}}{p}$$

p being the average length of haul on the system and t the average net tonnage per wagon-mile.

To this must be added the amount per slow freight ton-mile, compensation for loss, delay or damage, chargeable to this traffic.

Cost of rolling stock and haulage. — Assume that these costs are proportional to the gross ton-mileage, from which the net ton-miles can easily be derived.

Costs of permanent way. — In the preceding formula the variations of these costs in terms of the traffic are shown, omit the constant and calculate what the cost of running goods trains per train-mile is to the permanent way; knowing the net tonnage per slow freight train-mile, then obtain the net tons.

Costs of management and general administration. — In a first approximation, these items can be omitted as their increase is decidedly slower than that of the traffic.

Capital charges for construction. — Knowing the slow freight net ton mileage per wagon-mile, add the data $i+k+n$.

The total should give, at least, the relative magnitude of the partial net cost of the slow freight ton-mile.

II. — Net cost per fast freight train-mile.

Taking into account :

1° The average number of passengers for each train;

2° The fast train net ton-mileage (luggage, goods), which it carries;

3° The average number of registrations per ton (fast train), the fast train data *a*, *b*, *c*, *d*, *e*, *f*, are taken into consideration.

Add the fraction for compensation for loss, damage, delays falling to this traffic.

Haulage. — Assume that the costs of rolling stock and haulage are proportional to the average gross tonnage per train mile.

Capital charges for construction. — Include the data $j+m+q$.

The total gives an approximate value of the partial net cost for the fast train-mile.

[624 .65 & 721 .9]

2nd SUPPLEMENT TO REPORT No. 2 [1]

(Holland)

ON THE QUESTION OF REINFORCED CONCRETE (SUBJECT IV FOR DISCUSSION AT THE NINTH CONGRESS OF THE INTERNATIONAL RAILWAY ASSOCIATION), [2]

By C. LEEMANS,

ENGINEER OF THE WAY AND WORKS DEPARTMENT OF THE DUTCH RAILWAY COMPANY.

Figs. 1 to 10, pp. 348 to 356.

QUESTION 1. — *Have you carried out any constructional work in reinforced concrete on the State Railways of Java and Sumatra during the years 1913-1920?*

QUESTION 2. — *What are the structures? Please give a description and sketches if possible.*

The principal structures in reinforced concrete carried out in the Dutch Indies (Java and Sumatra) during the years 1915-1920 are as follows :

1. — A viaduct over the Wai Galik Koeala, Southern Sumatra Railway, consisting of seven 15 m. (49 ft. 3 in.) spans and one of 10 m. (32 ft. 10 in.).

2. — An arched bridge with a 25 m. span on the Wai Karoepan, Sumatra Railway.

3. — A viaduct over the Kali-Belang on the Cheribon-Kroja line of the State Railways of Java, consisting of twenty three spans of 9 m. (29 ft. 6 in.) each on concrete piles varying in height from 8 to 25 m. (26 ft. 3 in. to 82 feet).

The structure is divided into two parts, each forming a continuous girder 100 m. (328 feet) long and separated by means of an expansion joint in the centre of the viaduct.

It was built during the war in the years 1915-1916 in reinforced concrete on account of the impossibility of obtaining steel or iron.

The scheme was designed and completed under the supervision of the Dutch Reinforced Concrete Company of The Hague.

The structure includes 700 m^3 (24 720 cubic feet) of masonry in free stone for the foundations and 1 790 m^3 (63 220 cubic feet) of reinforced concrete (figs. 1 and 2).

4. — A bridge in reinforced concrete over the Kali Proepoek, Cheribon-Kroja

(1) See *Bulletin of the International Railway Association* for January 1921, p. 3, and for August 1921, p. 1108.

(2) This question runs as follows : « Use of ordinary concrete and of reinforced concrete on railways. »

Fig. 1. — Viaduct over the Kali-Belang on the Cheribon-Kroja line of the State Railways in Java.

Fig. 2. — Viaduct over the Kali-Belang on the Cheribon-Kroja line of the State Railways in Java.

line; four spans of 12, 14, 14 and 12 m. of a total length of 74 m. (243 feet) built in the years 1915-1916 in reinforced concrete for the same reason as No. 3.

The plans were got out and the work undertaken by the Bridge Construction Department of the State Railway. It is a continuous girder resting on three piers and two abutments in reinforced concrete.

The girders and piers are connected together, but the abutments are entirely independent of the superstructure (figs. 3 and 4).

The foundations of the piers are monoliths of reinforced concrete in order better to resist the great floods of the river (Bandjirs).

5. — A bridge in reinforced concrete on the Tjilewaeng, on the Meester Cornelis to Mangaraï line near Batavia, consisting of a big arch 38 m. (124 ft. 8 in.) effectual span, and a rise of 6 m. 65 (21 ft. 9 13/16 in.) and two smaller spans 8 m. (26 ft. 3 in.) long.

The bridge is designed and built as a three hinged arch for the dead load ; after seven months the hinges were covered in concrete, thus casing them in. It was thought that after this length of time any small deformations that might take place at the abutments and shrinking of the concrete would have reached their maximum limit.

The bridge was designed and its construction undertaken by the Bridge Department of the State Railway.

Figure 5 shows the hinged joint during construction; figure 6 shows the viaduct under construction and figure 7 when finished.

The viaduct was designed on the basis of supporting a train consisting of two locomotives each weighing 168 t. and having a length of 19 m. 20 (63 feet).

It has a double track of standard gauge (1 m. 067 [3 ft. 6 in.]), each track being laid on an independent viaduct made up of two arched girders in reinforced concrete connected together by cross-stays; the two structures rest on continuous abutments common to both.

It was built up on a wooden centering supported by a foundation consisting of seven groups of 16 piles 10 m. 50 to 12 m. (34 ft. 6 in. to 39 ft. 5 in.) long.

The centering proper was completely independent of the foundations and rested on the latter through the medium of metal boxes filled with sand. When the arch was finished, this sand was let out through small openings in the boxes so that the centering came down to its place as regularly and uniformly as possible.

It was possible to regulate this action very exactly by the opening and shutting of the small holes, so that the result was quite satisfactory.

The line of thrust of the arch was arranged so that after removal of the centres its dead load should keep it in a condition of equilibrium, it was therefore under simple compression throughout.

In order to obtain this result, the arch was built with three provisional hinges which were afterwards covered up with concrete to form the casing as explained above.

This method is explained in sketches 1 and 2 in figure 9 and by figure 5.

In order to avoid unsymmetrical deformations that might be harmful during the construction of the arch, the method of building was by alternative voussoirs, as shewn in sketch 3, figure 9. The intervals between these voussoirs were filled with concrete when the arch had about taken its definite position.

The forming of these voussoirs was

Fig. 3. — Reinforced concrete bridge over the Kali-Proepoek, Cheribon-Kroja line of the State Railways in Java.

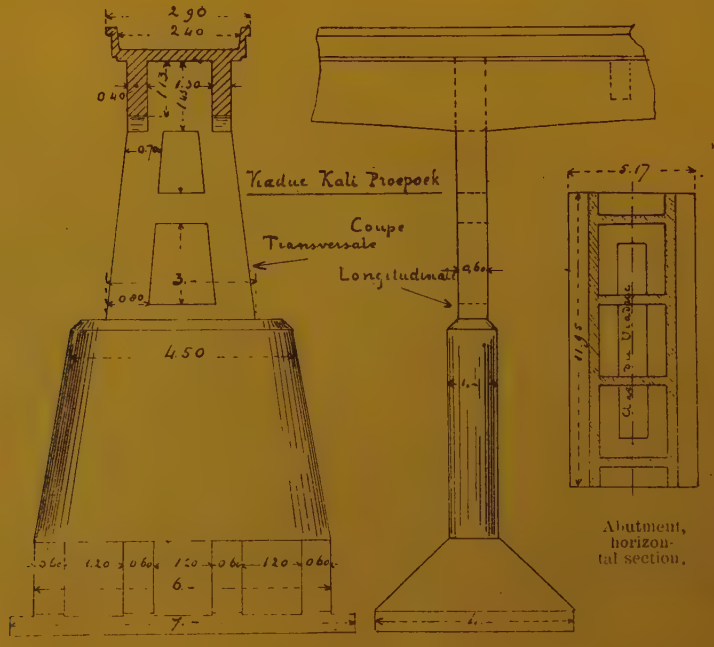


Fig. 4.

Fig. 5. — Reinforced concrete bridge over the Tjilewaeng, on the Meester Cornelis line to Mangaraï near Batavia (Java).

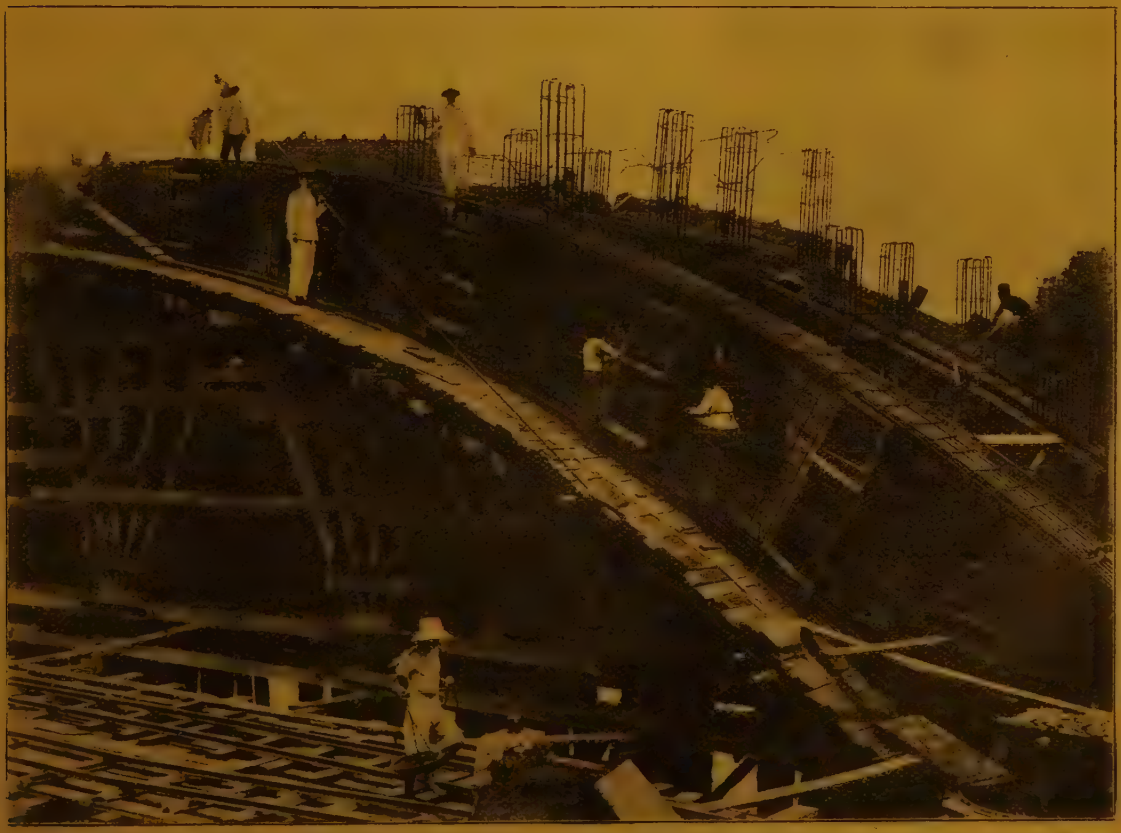


Fig. 6. — Reinforced concrete bridge over the Tjilewaeng, on the Meester Cornelis line to Mangaraï near Batavia (Java).

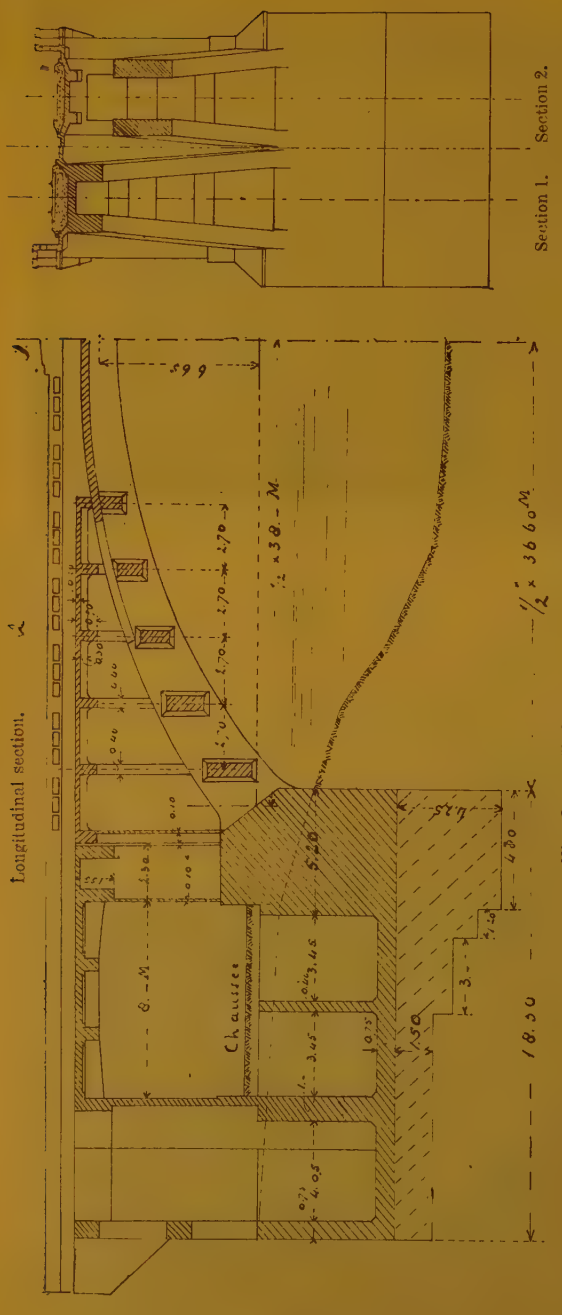


Fig. 8. — Viaduct over the Tjilewneng (Java).

accomplished in the following order : 1 and 1′; 6 and 6′; 2′ and 2; 5 and 5′; 7; 3′ and 3 and finally 4 and 4′. In course of moulding the voussoirs 2 and 2′, etc., the small central support shewn between the voussoirs 2-1 and 2′-1′ was also formed.

These small supports between the voussoirs served as temporary supports for the top blocks lying on those below during the filling up of the spaces (fig. 14).

It was first found by tests that the small supports would be strong enough to resist the pressure of the top blocks.

After the removal of the centres, the bridge was left unfinished, as shewn in figure 5, for eight months, after which the hinges were filled in with concrete and cased in.

Three months later the bridge was put into service after being tested by a train consisting of two locomotives of the total weight given above, at a speed of 50 km. (31 miles) per hour; the deflection of the keystone did not exceed 1 mm. 5 (1/16 inch).

It should be mentioned that the concrete was made of a very even mixture.

6. — A viaduct over the Tjikoeda (Java) on the Rantjaekek to Soemedang Railway, consisting of six arches of reinforced concrete 14 m. (46 feet) wide, on piers 20 m. (65 ft. 7 in.) high, and stonework abutments (figs. 10 and 11).

7. — A viaduct over the Tjikeroeh on the same line (figs. 12 and 13).

8. — A viaduct over the Ngaglik road near Soerabaja, made up of two single line bridges with a clear span of 15 m. (49 ft. 3 in.). The girders are supported by hinged joints on concrete foundations;

Fig. 7. — Reinforced concrete bridge over the Tjilewaeng, on the Meester Cornelis line to Mangarai near Batavia (Java).

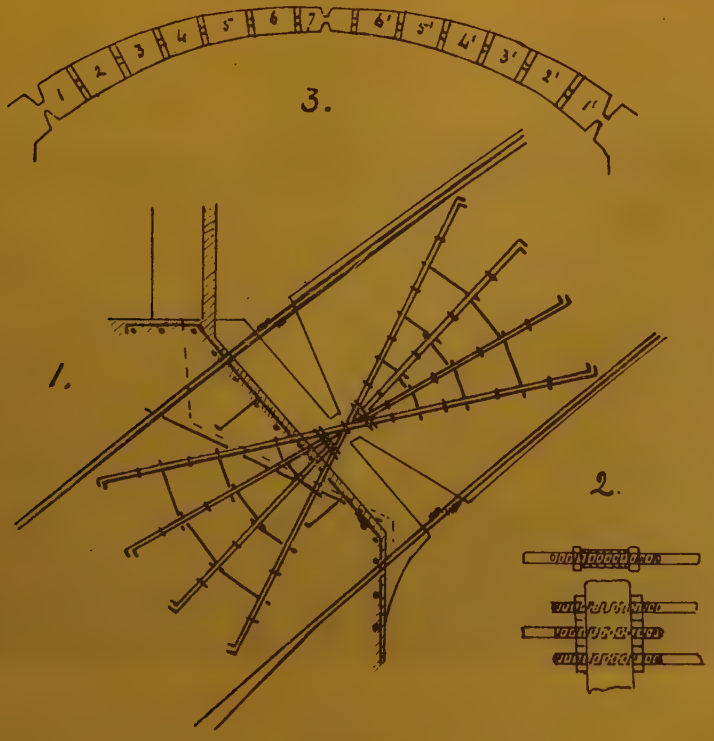


Fig. 9.

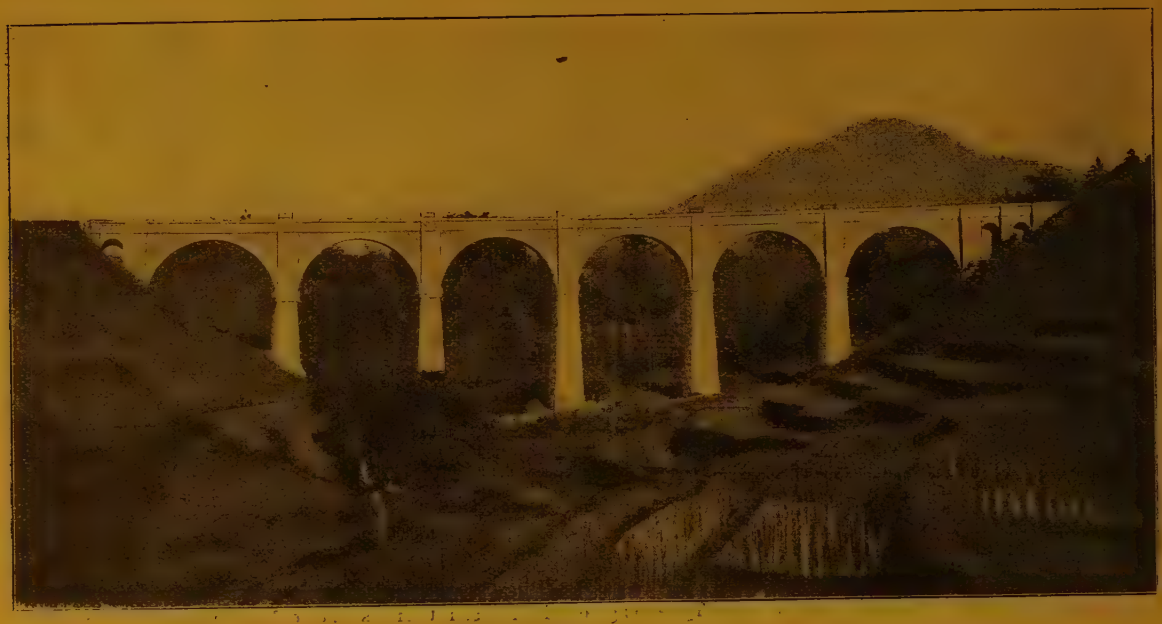


Fig. 10. — Viaduct over the Tjikoeda pass (Java) on the railway line from Rantjaekek to Soemedang.

Fig. 11. — Viaduct over the Tjikoeda pass (Java) on the railway line from Rantjaekek to Soemedang.

Fig. 12. — Viaduct over the Tjikeroeh (Java) on the railway line from Rantjaekek to Soemedang.

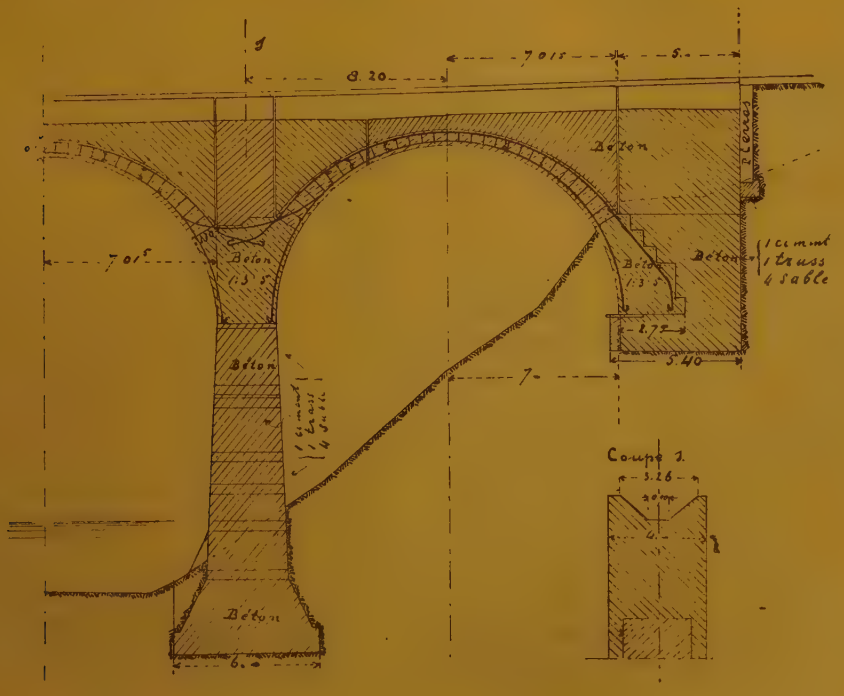


Fig. 13. — Viaduct over the Tjikeroeh (Java).

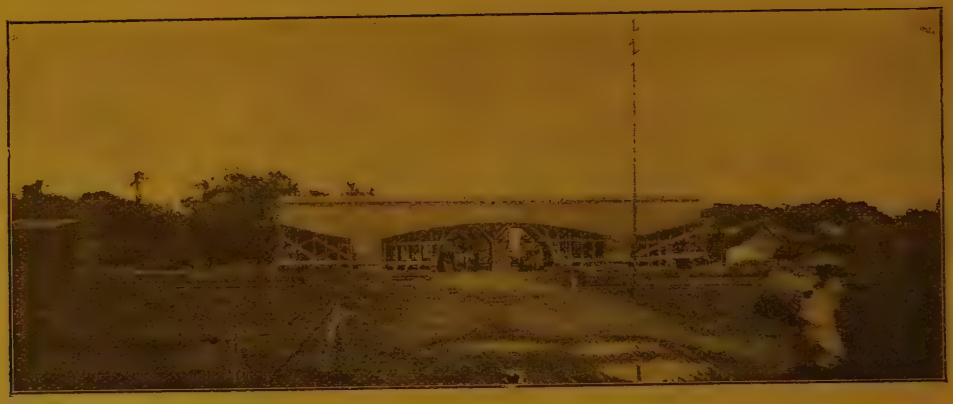


Fig. 14. — Viaduct over the Ngaglik roadway near Soerabaja (Java).

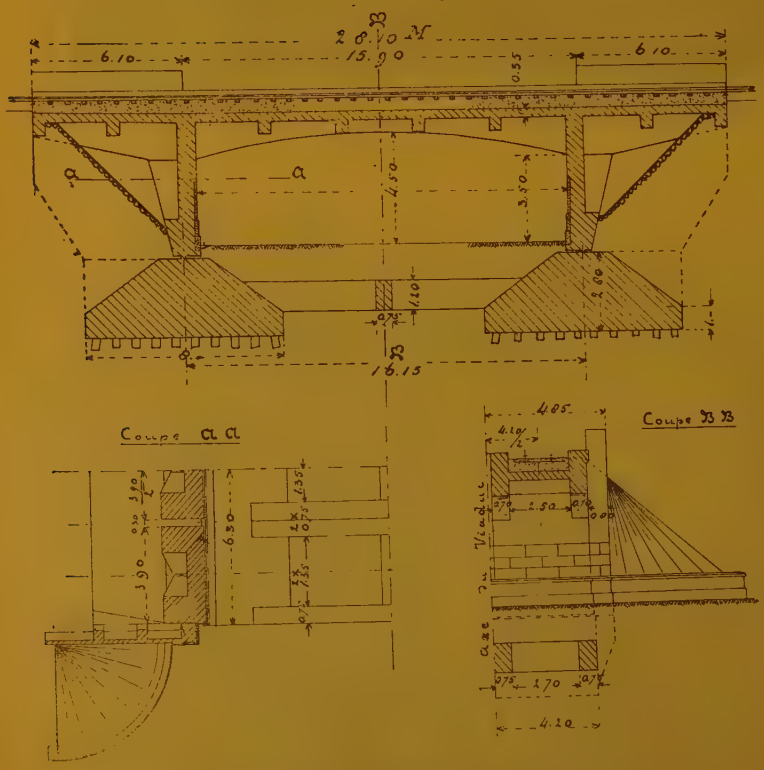
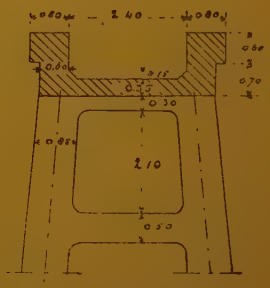


Fig. 15. — Viaduct near Soerabaja Ngaglik roadway (Java).



Cross section.

Fig. 16. — Viaduct over the Kali-Belang (

Explanation of the French term : Coupe = Section

the latter are built on wooden beams 16 m. (52 ft. 6 in.) long.

The hinges are made of round iron.

The viaducts, as in Nos. 7 and 8, were designed for carrying the locomotives as mentioned above by the Bridge Department of the State Railways and constructed under its supervision in 1920 (figs. 14 and 15).

QUESTION 3. — *Have you experienced any difficulties with these materials? What are these difficulties and are they specially connected with tropical countries?*

The viaduct over the Kali-Belang is one of the first structures in which attention was drawn to a very large number of cracks which formed in the flooring at a distance of about 20 cm. (8 inches) apart and half a millimetre (1/32 inch) in width perpendicular to the axis of the viaduct. These cracks penetrate the layer of concrete and reach to the main bracings, so that in time the viaduct will require special supervision and careful upkeep.

These cracks are attributed to the shrinking of the concrete in setting, due to particular arrangement in the design.

The superstructure is in the form of a trough, the sides of which are much thicker than the bottom (fig. 16), on which the ballast is placed. During the setting the shrinkage took place more rapidly in the bottom than in the sides, so that the bottom was, so to speak, torn by the action of its own internal stresses in opposition to those of the sides.

A second cause suggested for the cracks is the use of too wet a mixture; this is an effect due to the tropical climate.

Water which is not absorbed by the Portland cement is exposed to rapid evaporation in this hot climate. Consequently it is considered dangerous to use more water than the cement can absorb, and it is necessary that the concrete should have the consistancy of thick mud.

A similar phenomenon was met with during the construction of the viaduct over the Tjilewoeng.

* * *

We will finish by mentioning the conclusions arrived at by Dr. J. H. A. Haarman, Engineer, Chief Engineer of construction of bridges of the State Railway in Java, who has made a thorough study of concrete and its uses :

1° The opinion that vibration caused by the passage of trains would be more detrimental to reinforced concrete bridges than to steel superstructures has no foundation in fact;

2° A bridge in reinforced concrete, provided it is well designed and carefully constructed, is as safe as a steel bridge. It has also the advantage of allowing the lines to be laid on ballast;

3° A greater train speed may be allowed than with a steel structure;

4° The advantage which at first sight seemed to favour the reinforced concrete bridge in comparison with the steel bridge, as far as upkeep costs are concerned, is not borne out in practice. On the contrary, it is to be feared that

amongst the structures in reinforced concrete, one at least will be found which will cause trouble in this respect and which will require much more attention for upkeep than a steel structure;

5° Structures in reinforced concrete cannot be strengthened, they have to be pulled down and replaced by others.

The loadings which must be assumed in the calculations must be chosen so as to ensure that they shall not be exceeded in the future.

[385 .517.7]

REPORT No. 2

(all countries, except America)

ON THE QUESTION OF WORKMEN'S DWELLINGS (SUBJECT XVI FOR DISCUSSION AT THE NINTH CONGRESS OF THE INTERNATIONAL RAILWAY ASSOCIATION), (1)

By FAUSTO LOLLI,

DIVISIONAL CHIEF IN THE WORKS DEPARTMENT OF THE ITALIAN STATE RAILWAYS.

Figs. 1 to 12, pp. 364 to 378.

In order to collect the necessary information on this subject we sent a questionnaire to 75 administrations in Europe or the colonies. Another reporter will deal with the question as far as America is concerned.

We have received 32 replies (2) 25 of which are from railways of different countries in Europe, and 7 from colonial railways.

The questionnaire is divided into three sections, *viz* :

Section A, concerning the staff housed within the boundaries of or near to the railway owing to the exigencies or in the interests of the service;

Section B, concerning the staff for which the railway company provides housing without however obliging such employees to live within the boundaries of or near the railway;

Section C, concerning the assistance given by the company to enable the initiative of employees to build their own houses.

The replies to the various questions comprised in these sections are set out in the three tables at the end of this report, and are summarised below :

SECTION A.

QUESTION 1. — *What classes of railway employees are lodged owing to the exigencies or in the interests of the service in dwellings provided by the administration or railway company, and situated within the precincts of or near the railway premises?*

a) *Staff of the engineer's department.* — It may be said that in general housing is provided for the inspection staff, and in part for the workmen of the permanent way department, that is to say for the employees who have the most direct responsibility for upkeep of the line.

Some companies also provide housing for foremen and superintendents.

(1) This question runs as follows : « How is the problem of dwellings for their workmen and lower-grade employees solved by the railways? How do the administrations assist the individual efforts made by the staff, in particular as regards the building of dwellings for the use of labourers and employees? »

(2) Three other replies, which arrived too late, could not be utilised in this report.

b) *Staff of the locomotive, carriage and wagon departments.* — Some companies do not provide any housing for this staff, but in the majority of cases they house the locomotive superintendents and assistant superintendents, and sometimes also employees in other grades, such as drivers, firemen, fitters, etc.

In exceptional cases some of the Shopmen are provided with dwellings.

c) *Staff of the traffic department.* — All the companies, to a greater or less degree, house the station staffs and especially the stationmasters and assistant stationmasters, and sometimes the telegraphists, signalmen, guards, etc.

On the Swedish State Railways and some colonial railways housing is found for the supervisory staff, such as the engineers, inspectors and sub-inspectors.

QUESTION 2. — *Is the lodging of the above classes of employees and workmen in buildings belonging to the railway company always allowed free?*

Seven companies provide free lodging; 13 companies require a small rent from all grades of employees; the others treat the different grades in different ways, giving free housing to some, and requiring a rent from others.

QUESTION 3. — *In case of insufficiency of rooms to lodge any of the employees mentioned in question 1, does your company make an allowance so that they may find quarters elsewhere near their work?*

Seventeen companies make an allowance to all or to a part of the employees mentioned in the 1st question. Eight companies make no allowance. Among the latter may be mentioned the Bergslagen Railways (Sweden) and the Swiss Federal Railways, which possess a sufficient number of dwellings for all the employees who have to live near the railway.

QUESTION 4. — *What is the amount of this allowance?*

In general this allowance varies according to the grade of the employee, and sometimes even according to the locality.

For example on the Northern Railways of Spain it varies from 300 to 2 600 pesetas per annum.

Some French Companies fix this allowance at 10 % of the salary.

On the Italian State Railways it varies from 10 to 30 l. per month.

QUESTION 5. — *What is the total mileage of the system worked by your company?*

The length in miles of the railways which have replied to the questionnaire varies from 248 km. (154 miles) (Luxembourg : Prince Henry Railway & Mineral Company) to 18 471 km. (11 478 miles) (South African Railways and Harbours).

QUESTION 6. — *What is the effective total number of workmen employed on your railway, and how many per mile?*

As regards the European companies the number of employees per km. varied, as is shown by the replies received, from a minimum of 5.6 (9 per mile) in the case of the Bergslagen Railways, Sweden, to a maximum of 20.2 (32.5 per mile) in the case of the Belgian State Railways, and 46.4 (74.7 per mile) on the Lancashire & Yorkshire Railway of Great Britain;

that is to say, between limits which were so wide that, especially as regards the staff of the English Company, the Lancashire & Yorkshire Railway (1), further inquiries would have been made had time permitted.

QUESTION 7. — *How many employees are lodged in buildings provided by the company?*

The percentage of employees who have houses provided by the companies varies from about 5 % (French Eastern Railways) to about 17 % (Bergslagen Railways, Sweden).

As regards the colonial companies, it may be remarked that the Algerian State Railways lodge 11 % of the staff, and that the Bengal-Nagpur Railway Company of India lodges, with certain exceptions, all its staff.

QUESTION 8. — *What is the number of employees to whom the company allows lodging out expenses as per question No. 3 above?*

As a general rule the number of employees in receipt of the allowance referred to in question 3 above is very small in proportion to the total number of employees. The proportion is, however, greater in the case of the Italian State Railways where it is about 5 % of the total staff.

QUESTION 9. — *Has your company or administration, in order to curtail working expenses, and particularly to reduce that sum on its budget for lodging out purposes, recently adopted measures, or is taking them into actual consideration to reduce the number of its employees?*

It appears from the answers given to this question that very few companies have formed any definite programme for the attainment of this object.

The Administration of the Belgian State Railways proposes to reduce to a minimum the service at level crossings, to limit the inspection service to the more dangerous parts of the line and as regards the other portions of the line to rely on the gangers when they inspect each length in the morning.

Similar measures have been adopted by the Italian State Railways, which have already begun the experiment of leaving unattended those level-crossings which are little used and which are visible from some distance. These railways arrange the frequency of the inspections of the permanent way, according to the importance and condition of the line. Further, this Administration is at present considering the advisability of farming-out to contractors the work of general inspection of the super-structure.

The administration of the Danish State Railways reports that lately, in order to reduce the cost of housing, it has tried the adoption of very economic types of houses, and that consideration is now being given to the possibility of reducing the cost of working by diminishing inter alia the number of employees.

The Norwegian State Railways are also at present considering what measures can be adopted to reduce the number of employees; and a similar proposal is being considered by the French Midi Railway Company, which states that this reduction could not possibly have any in-

(1) It should be noted that the Lancashire & Yorkshire Railway is a line of comparatively speaking short length, and by far the greater part of its route runs through an intensely industrial district.

fluence on the cost working, because it is not possible to reduce the number of positions which carry the privilege of free lodging.

QUESTION 10. — *Has your company, in the interest of the service, any intention of increasing the size or number of lodging houses within the precincts or in proximity of the railway premises?*

Of the administrations of Continental Europe only five have given an affirmative reply; the other twenty have replied in the negative, or have said that they intend to limit new buildings to the indispensable minimum.

Of the seven colonial administrations, five have announced their intention of extending the construction of dwellings.

SECTION B.

Of the 32 above-mentioned administrations 26 only have replied to this part of the questionnaire.

QUESTION 1. — *Does your company arrange to find living quarters for any of its staff not included in the heading A above?*

QUESTION 2. — *With this object in view, has your company constructed or acquired suitable buildings?*

The answers to these questions are chiefly in the affirmative.

Apart from the housing crisis resulting from the war, and because of which the railway staffs, like other classes of citizens, find great difficulty everywhere in obtaining housing accommodation, the assistance of the Administration has, in some cases, been necessary to provide dwellings in localities where no private houses existed, or into which, by reason of new and important railway extensions, employees to a considerable number in comparison with the total population had to be brought. In Italy the interest of the railway Administration in the matter of employees' houses became particularly marked after the earthquakes of 1908 and 1915 in the regions of Reggio Calabria, Messina and Avezzano. Further, in France, in Belgium and in Italy, provision has had to be made for the construction of dwellings for employees in the regions devastated by the war.

In the case of certain railways these dwellings are available for the whole of the employees without distinction of grade.

In the case of the Italian State Railways, up to recent times dwellings might be provided for any employees whose remuneration was less than 5 780 l. per annum; but recent advances in wages necessitates an increase of this limit, which is based on a rate of remuneration which is generally exceeded at the present time even among the lower grades of employees. In the allotment of dwellings the procedure has been followed which was also adopted by the French Midi Railway Company, of giving the preference to the lowest paid employees, and to those having the most children dependent upon them.

QUESTION 3. — *What is the number of this class of buildings possessed by your company 31 December 1920?*

The following cases may be cited of administrations which possess a considerable number of these dwellings :

French Est Railway Company : 2 800 dwellings for families, and 1 000 rooms single men.

Great Britain : Great Western Railway : 2 356 dwellings.

Great Britain : London & South Western Railway : 1 850 houses and cottages.

Italian State Railways : 4 677 dwellings.

Dutch State Railways : 1 665 dwellings.

South African Railways & Harbours : 9 293 houses for the European staff.

QUESTION 4. — *How many of these dwellings are composed of one room and a kitchen? How many are there with two rooms and a kitchen?*

In the case of some administrations in France, and of the Norwegian and Italian Railways, the far greater number of these dwellings consist of two rooms and a kitchen.

In Switzerland preference has been given to dwellings of three or four rooms and a kitchen.

In England the majority of the dwellings belonging to the Great Western Railway and the London & South Western Railway have four rooms and a kitchen.

It may be said that in general these dwellings, with few exceptions, have a maximum of six rooms and a kitchen.

In this connection the hope may be expressed that new dwellings will have at least one bedroom for the parents and two bedrooms for the children, one for the boys, the other for the girls. The minimum size of dwelling should, therefore, be fixed at three rooms and a kitchen. It might, however, be permissible in large groups of dwellings to have a certain number consisting of two rooms and a kitchen, or even of one room and a kitchen. In these it might be possible to accomodate families having children of one sex only, or newly married couples.

QUESTION 5. — *What is the approximate cost per dwelling?*

The cost of these dwellings has, as a result of the war, become three or four times greater than previously, and in some countries the increase is even greater.

In Denmark the average cost per dwelling which before the war was about 1 000 crowns, is at present 3 500 crowns.

In France (Paris-Orleans Railway) the cost of a 4-roomed dwelling has increased from 6 000 to 25 000 fr.

In England (Great Eastern Railway) the cost of a cottage which before the war was £250, is at present £1 000.

In Italy the average cost per room was about 2 000 l.; to-day it may be taken at from 10 000 to 15 000 l. according to locality.

QUESTION 6. — *What amount of capital was invested in these dwellings on the 31 December 1920?*

In Europe the administrations which have spent the most on the dwellings with which this chapter is concerned are the following :

French Est Railway Company : 35 million fr., of which 30 000 000 have been spent since the war.

Paris-Lyons-Mediterranean Railways : 22 200 000 fr.

London & South Western Railway : about £796 000.

Italian State Railways : 84 500 000 l.

Among the colonial administrations may be mentioned the South African Railways and Harbours, which have spent a total of £4 580 000 on dwellings.

QUESTION 7. — *Has your company studied different types of dwellings, or im-*

portant groups of dwellings for the staff?

Several administrations have decided upon certain types for these dwellings. Figures 1 to 12 show some of these types.

Some administrations have also been compelled to build large groups of dwellings; among these may be mentioned the following :

In Spain, the group near the depot of Las Matas (Northern Railway).

In England, the London & South Western Railway Company has built a group of 154 cottages at Eastleigh (Hampshire).

In Italy, the State Railways have built their largest groups of dwellings at Mestre, Naples, Rome and Florence. The largest is that at Mestre, which includes 458 dwellings.

QUESTION 8. — *Have these dwellings gardens?*

According to the information received it appears that most of the administrations provide gardens to their houses.

As regards the size of these gardens, the Belgian State Railways allow an area of from 350 to 400 m² (420 to 480 square yards).

In France, the Paris-Orleans Railway

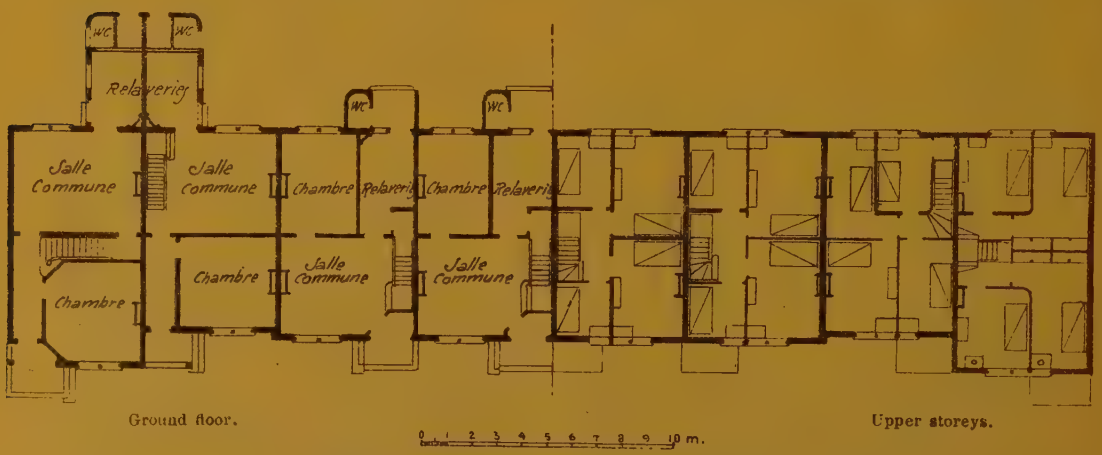


Fig. 1. — Belgian State Railways. — Type of dwellings for the staff.

Explanation of French terms : Relaveries = Sculleries. — Salle commune = Living room. — Chambre = Bedroom.

allows from 200 to 300 m² (240 to 360 square yards).

In England, the Great Eastern Railway Company allows about 500 m² (600 square yards), and the London & South Western Railway Company also endeavours to provide gardens to its cottages.

In Italy these houses have only been provided with gardens in certain cases, namely, in localities where the ground has been obtainable on reasonable terms.

QUESTION 9. — *If your company has established important groups of dwellings, has it also added schools, and shops for the supply of food?*

It will be seen from the replies received that the principal administrations have considered the question of the provision

of schools and shops to serve their more important groups of dwellings.

In Spain, the Northern Railway Company has established schools and shops near the groups of dwellings at the Barruelo mines and at Castejòn junction.

In France the administration of the Est Railways has provided huts in certain devastated regions to be used for schools and shops.

In France again the Paris-Lyons-Mediterranean Company has opened schools at Villeneuve-St. Georges and at Laroche, and has opened co-operative stores in certain localities

In Great Britain the Glasgow & South Western Railway Company has opened schools for children, and provision stores, in two districts in which it has built groups of dwellings.

In Italy the administration of the State Railways has opened shops in the localities where there are large groups of dwellings, as for example at Rome, Mestre, Naples, Milan, Turin. Further, this administration has provided at Rome and Florence recreation grounds for the use of children out of school hours.

As regards the Colonies, it may be noted that in the Indian Empire, the Madras & Southern Mahratta Railway Company has instituted schools and shops where groups of dwellings exist; and that a small number of schools have been provided on the Oudh and Rohilkhand Railway Company's system.

QUESTION 10. — *What funds are utilised by your company for acquiring or constructing these dwellings? Is it advisable to use the funds of provident societies?*

In the construction of these houses several administrations make use of their capital, while others borrow money specially for the purpose.

Among the administrations which have replied to the questionnaire, the Italian State Railways is the only one which at present uses the funds of the provident society.

In France the State Railways have made the experiment of using money furnished by the pensions fund for the construction of 22 dwellings at Thouars; but, since this fund is a self-controlled institution and the administration must guarantee it an annual revenue equal to the average revenue of the other invested securities of this fund, it has been decided, in view of the risks which might be incurred from the financial point of view, not to make further calls on the said fund.

The Swiss Federal Railways have also had recourse on one occasion to the pension and benevolent fund for the construction of 8 houses for employees at Basle station. They have, however, discontinued calling upon this fund, in order to avoid criticism on the part of the employees, who sometimes look upon the provident institutions as their own property.

QUESTION 11. — *What is the rate of interest on the capital invested? What basis is used to settle the amount of rent paid by the staff?*

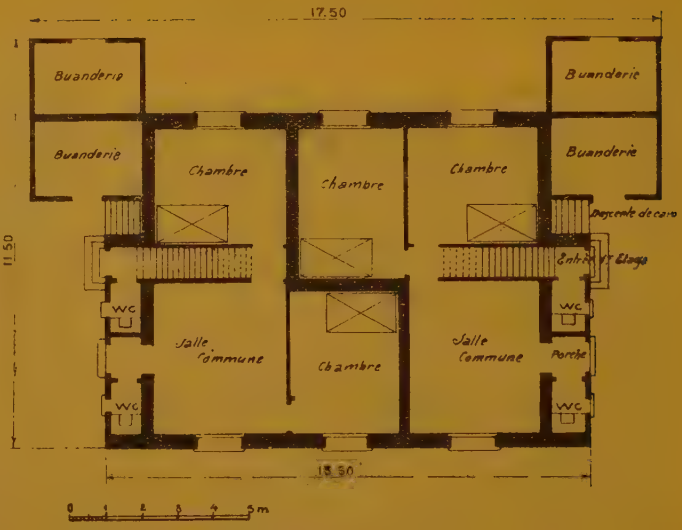
In the case of certain administrations a rate of interest not exceeding 3 % is required on the capital invested in these houses. In Italy, where, as we have said, use is made of the funds of provident institutions for the construction of these houses, the rate of interest is fixed at 3 3/4 %.

In the case of the Belgian State Rail-

Ground floor. Plan of I^st floor.

Group of eight two-roomed dwellings.

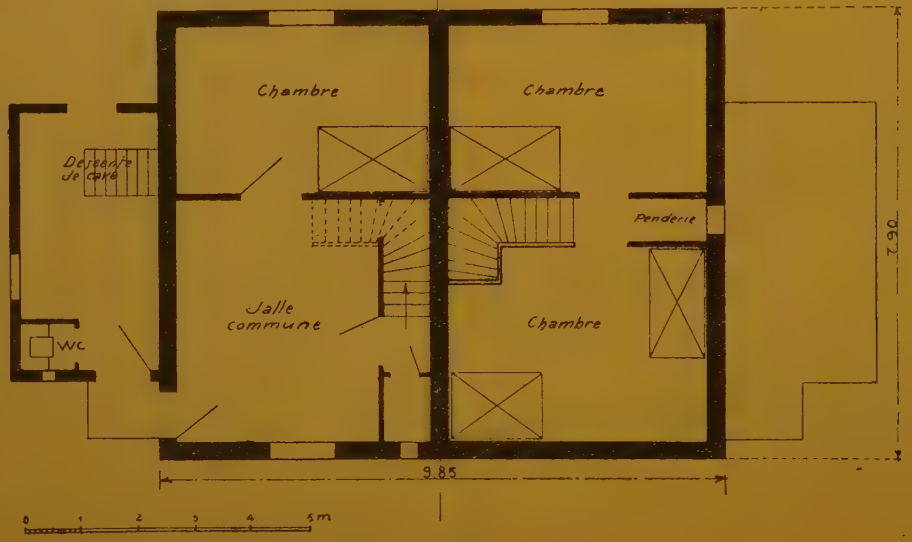
Plan of ground floor.



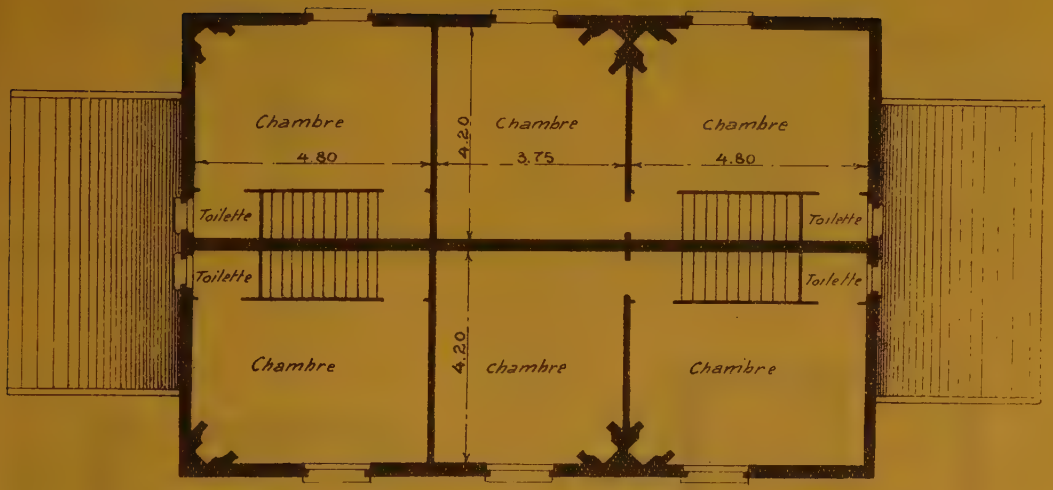
Group of four three-roomed dwellings.

Explanation of French terms : Salle commune = Living room. — Chambre = Bedroom. — Buanderie = Wash-house. — Descente de cave = Steps to cellar. — Entrée 1^er étage = Entrance to 1^st floor. — Porche = Porch. — Penderie = Drying room.

Plan of ground floor. Plan of 1^st floor.



Group of two four-roomed dwellings.



Plan of 1st floor.

Plan of ground floor.

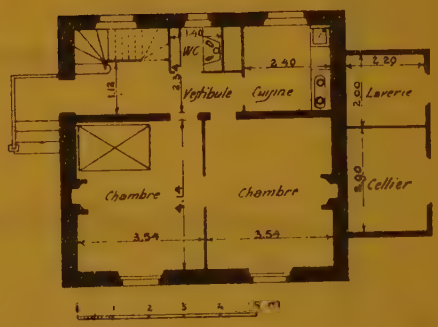
Fig. 3. — Paris-Orleans Railway Company. — House containing four three-roomed dwellings.

Explanation of French terms : Toilette = Lavatory. — Lavoir = Wash-house. — Débs = Lumber-room.

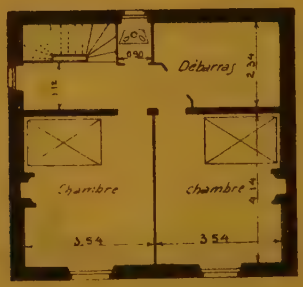
Main elevation.

Main elevation.

Plan.



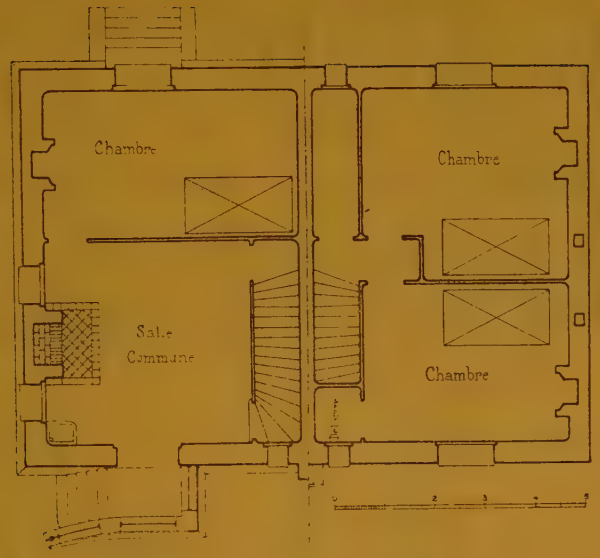
Ground floor.



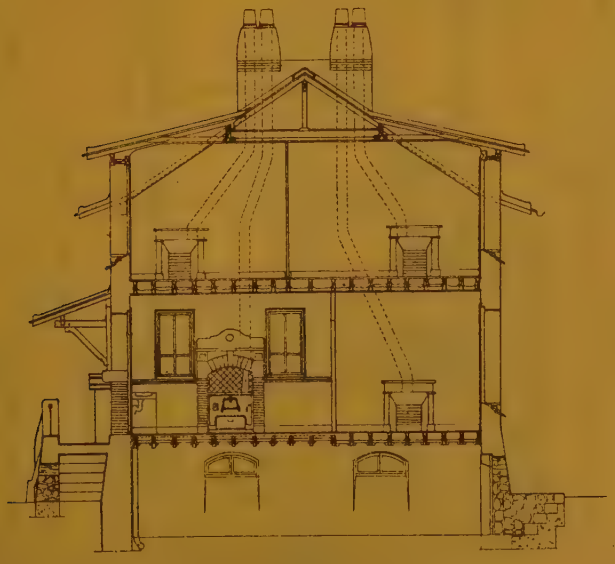
1st floor.

Fig. 4. — Paris-Orleans Railway. — Types of individual houses.

Explanation of French terms : Cuisine = Kitchen. — Laverie = Wash-house. — Cellier = Store-room. — Vestibule = Entrance hall. Débarras = Lumber Room.

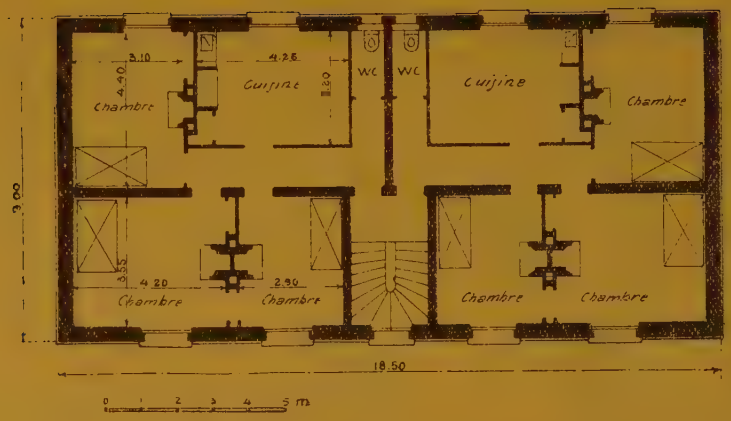


Ground floor. Half-upper storey.

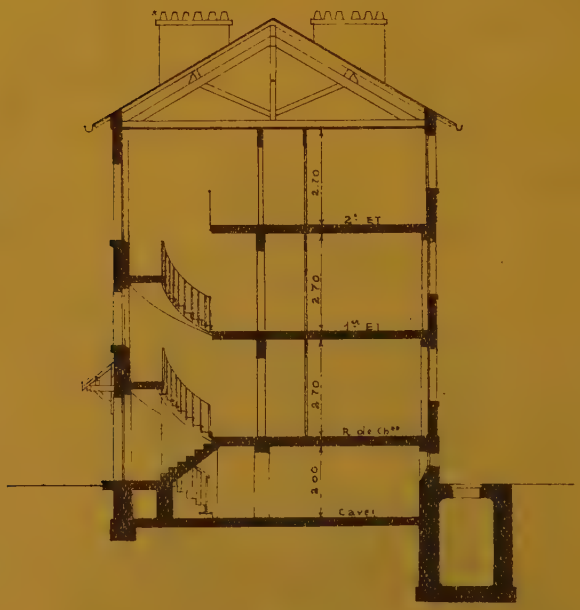


Cross-section.

Fig. 5. — French State Railways. — Type of two four-roomed dwellings.



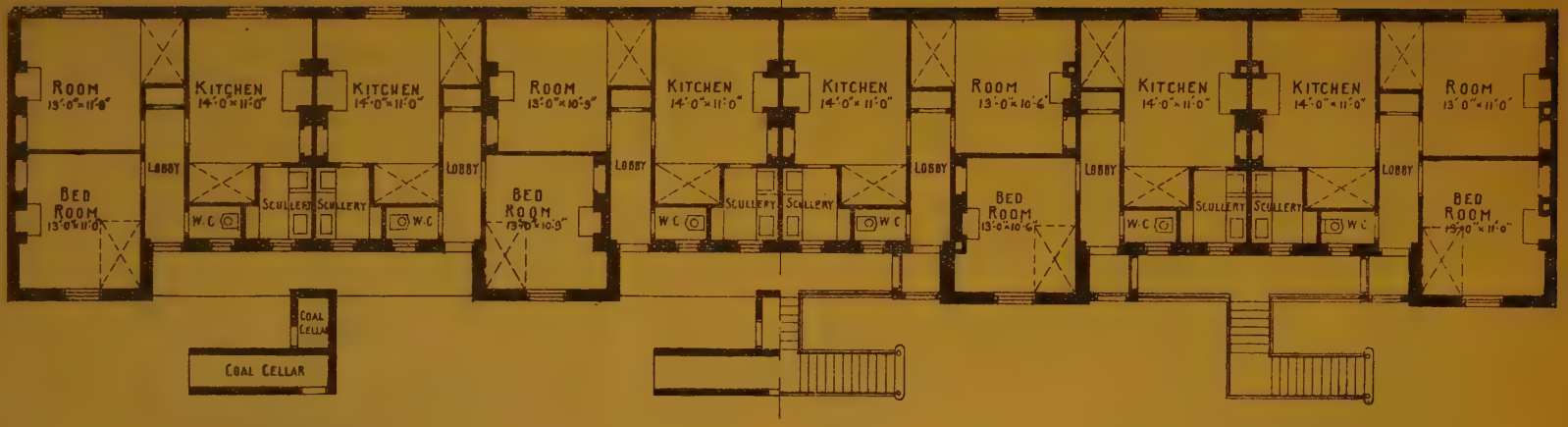
Plan of 1st floor.



Cross-section.

Fig. 6. — Paris-Lyons-Mediterranean Railway. « Laroche Station. » Dwelling house for employees.

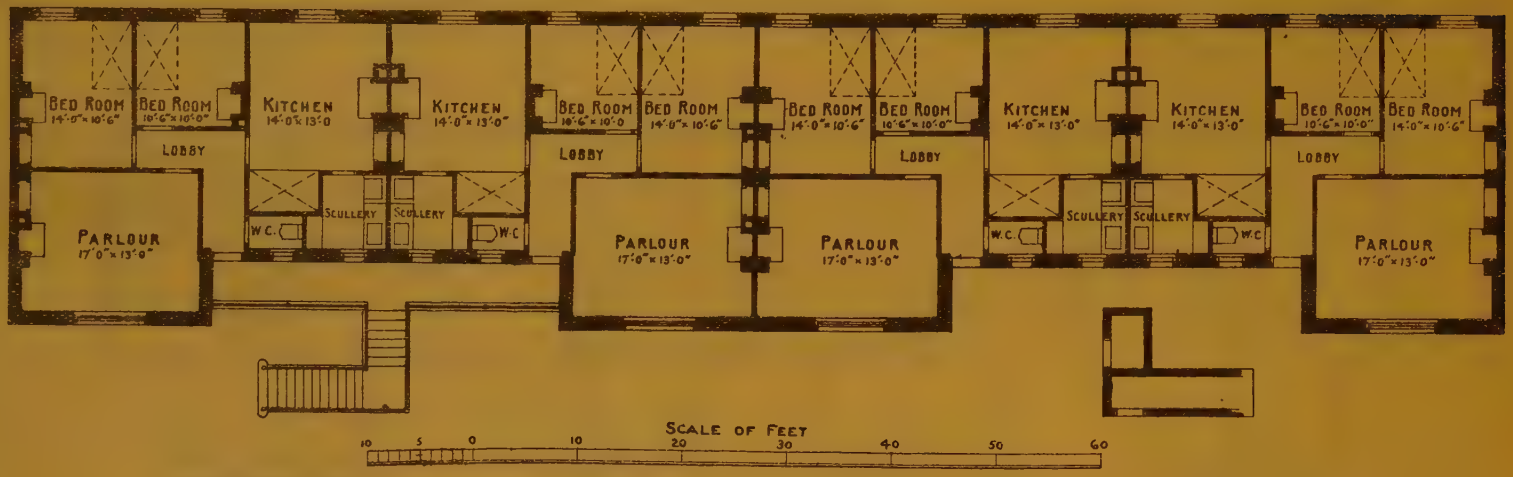
Explanation of French terms : 2e Ét. = 2nd floor. — 1er Et. = 1st floor. R. de chée = Ground floor. = Caves = Cellars.



Half-ground floor plan.

Half-upper floor plan

Block of 12 houses : 8 houses of 1 room and kitchen, 4 houses of 2 rooms and kitchen.



Half-upper floor plan.

Half-ground floor plan.

Block of 8 houses of 3 rooms and kitchen.

Fig. 7. — Glasgow & South Western Railway. — Workmen's houses at Corker Hill.

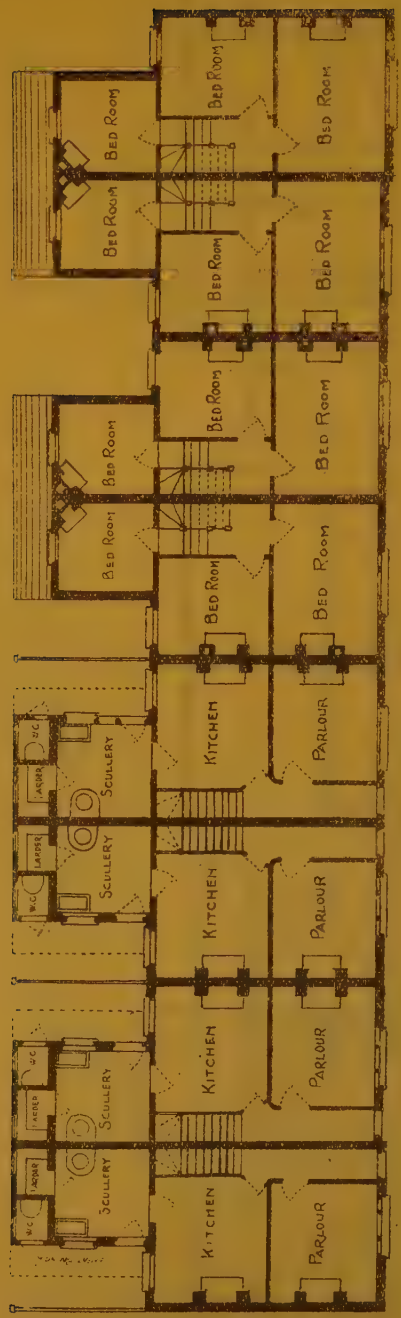


Fig. 8. — Great-Britain. South-Eastern Railway. — Types of dwellings.

ways and the Swiss Federal Railways this interest amounts to 4 %, and it varies between 2 % and 5 % for the Norwegian State Railways.

In the case of the colonial railways, the rate of interest is higher, and even reaches 6 1/2 %.

As regards the amount of rent asked from employees, some administrations state that in fixing this amount they take into account the cost of construction of the dwellings and the wages of the employees. Other administrations take as a basis the average rents payable in the locality for private houses of a similar type.

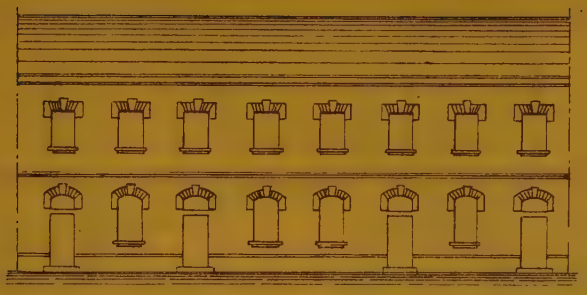
The Italian State Railways require the payment of a rent equal to 5 1/2 % of the cost of construction; as has been noted above, 3 3/4 % of this represents the interest on capital invested while the remainder covers the costs of management, upkeep, taxes, etc.

QUESTION 12. — *Have you made arrangements to adjust the rents of dwellings of recent construction which cost much more than those built before the war?*

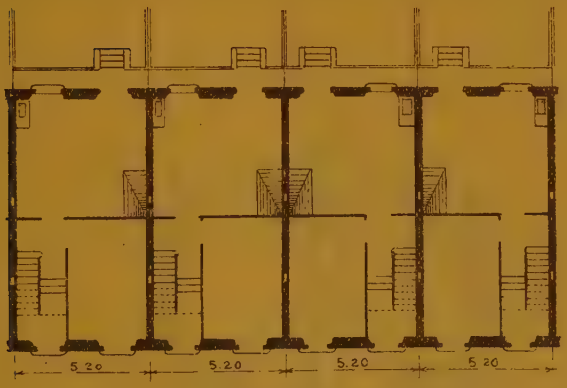
In this connection some administrations are content with obtaining a reduced revenue on the capital invested.

In France the administration of the State Railways has adopted the policy of slightly raising the rents of houses built before the war in order to compensate somewhat for the considerable loss arising from the fact that it is impossible in the case of new buildings to obtain a return equal to a normal rate of interest on the capital invested.

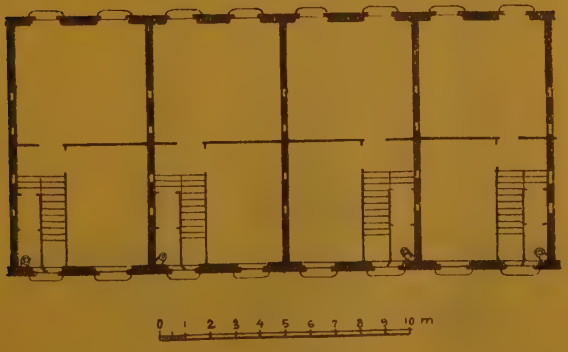
The same procedure has been adopted by the administration of the Italian State Railways. As regards new dwellings on this railway system, it is to be noted that the administration shoulders a consider-



Main elevation.

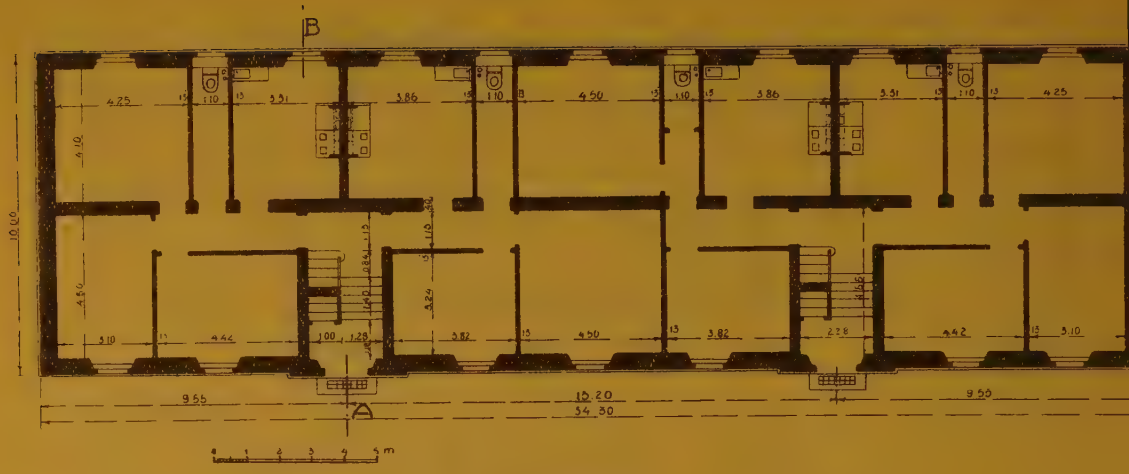


Ground floor.

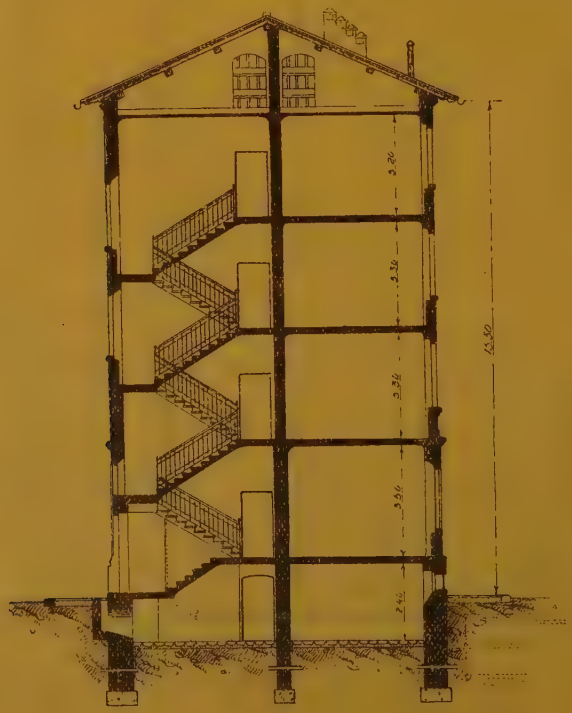


Plan of 1st floor.

Fig. 9. — Italian State Railways. — Economic houses for the staff.

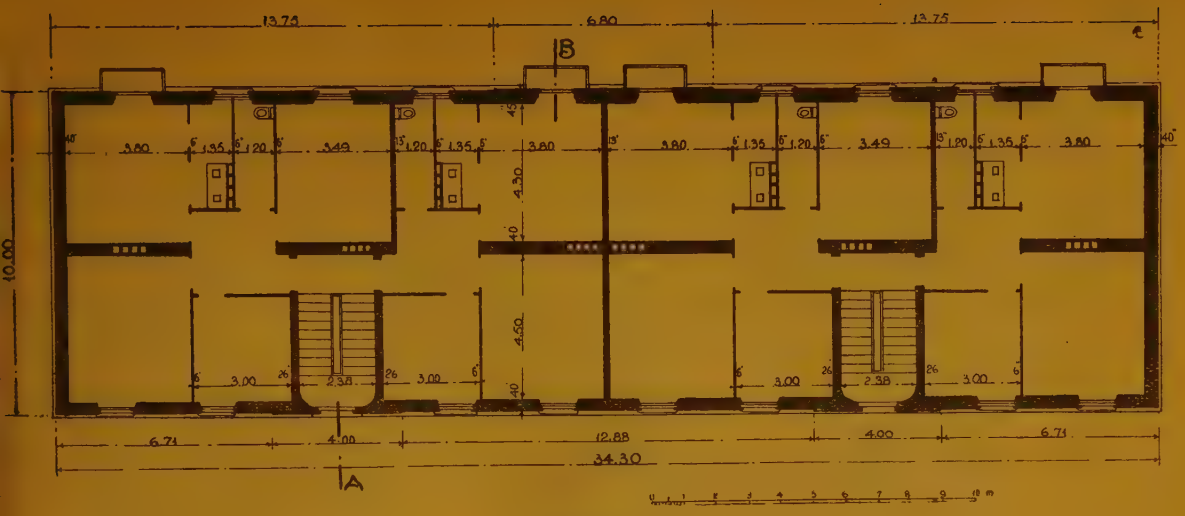


Plan of ground floor.



Cross section.

Fig. 10. — Italian State Railways. — Economic houses for the staff.

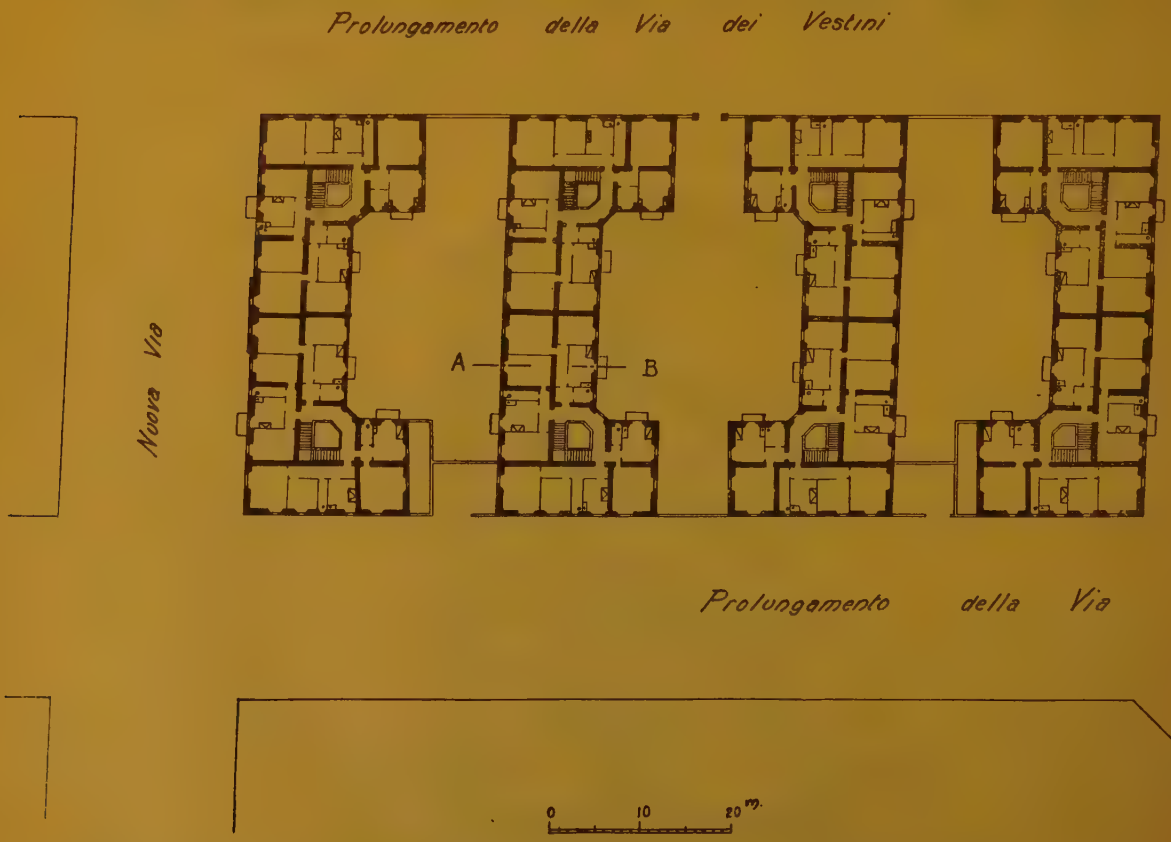


Plan of 1st floor.

Cross section.

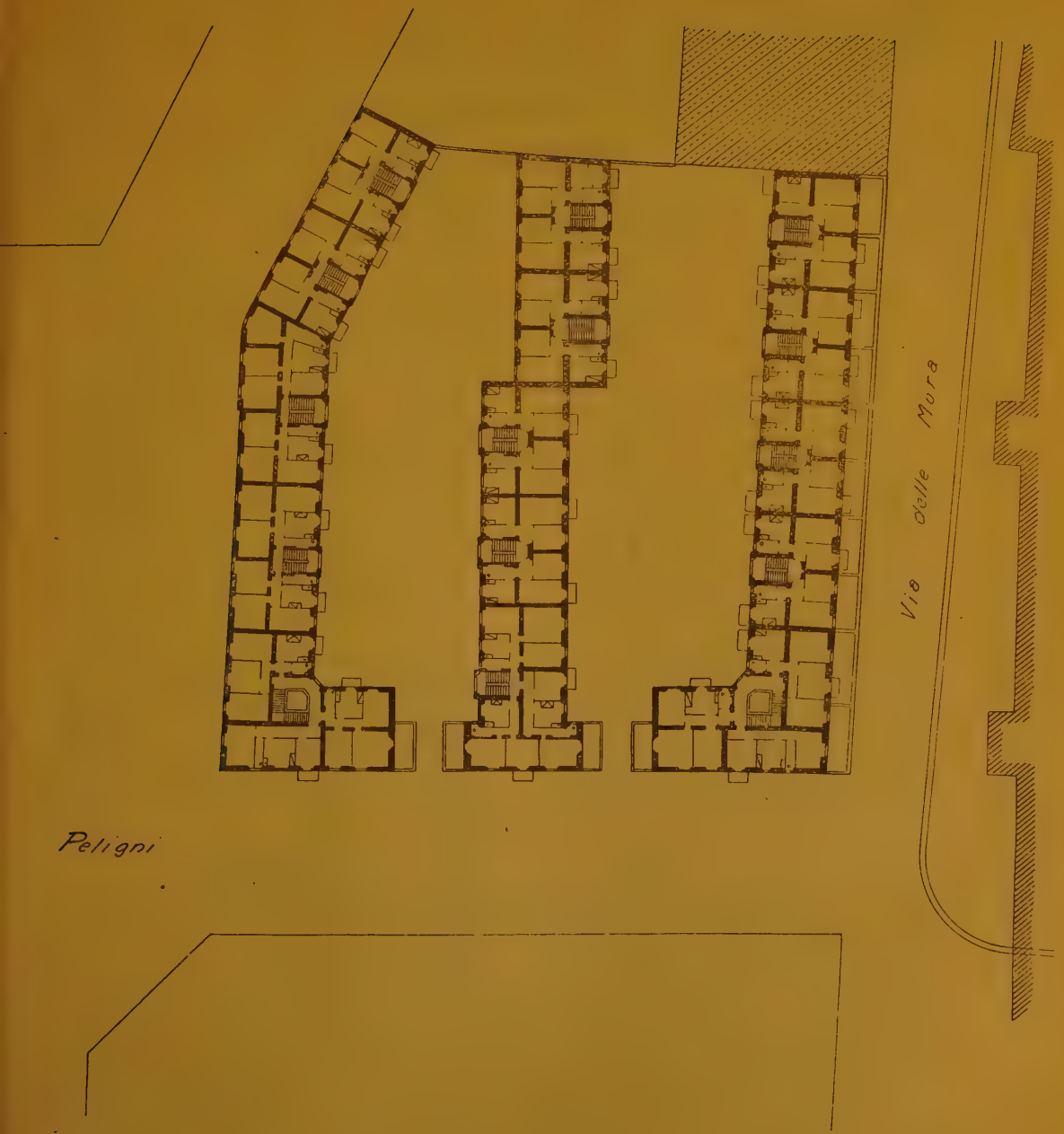
Fig. 11. — Italian State Railways. — Economic houses.

Explanation of the Italian term : Pend = Slope.



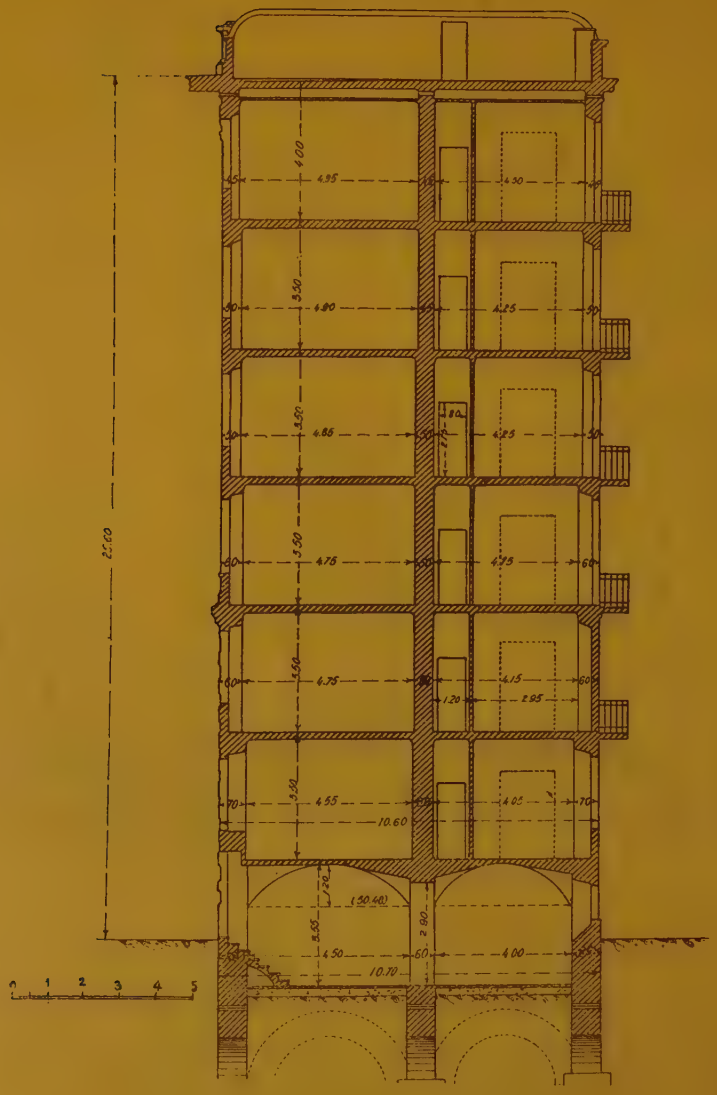
Explanation of Italian terms : Prolungamento della Via dei Vestini = Extension of the Via dei Vestini. — Nuova via = New street. — Prolungamento della Via dei Peligni = Extension of the Via dei Peligni. — Via delle Mura = Delle Mura street.

Fig. 12. — Italian State Railways



an.

conomic houses for the staff at Rome.



Cross section.

Fig. 12 (*continued*). — Italian State Railways.
Economic houses for the staff at Rome.

able part of the expense by paying interest at the rate of 2 1/2 % per annum on the capital invested; the State also pays interest at the rate of 1/4 %, so that the amount of rent, which in the case of old houses is fixed at 5 1/2 % of the cost of construction, works out in the case of newly-built houses at only 2 3/4 %.

QUESTION 13. — *What are the advantages enjoyed by the staff occupying these dwellings? What is the reduction in rent, expressed in so much per cent, in comparison to a private house of similar construction?*

These advantages are principally those of living in modern, healthy and well-arranged houses, often with a garden, and of paying as a general rule a lower rent than that payable in privately owned houses. Another appreciable advantage lies in the security of tenure, especially at the present time when there are no empty houses anywhere.

The reduction of the rent as compared with that payable in private houses of a similar type varies very much on the different railways; and varies, according to the answers received on this point, between 15 and 80 %.

QUESTION 14. — *What programme do you expect to follow in the future? Please explain the arrangements made by your company for the management of these dwellings?*

Many of the administrations which have replied to this question do not propose to extend the construction of these houses on any general lines, but according to requirements, and as far as possible having due regard to the very high cost of building at the present day. Consequently they cannot at present draw up a programme for the future.

It is to be noted in this connection that the administration of the French East Railway Company has announced its intention of patronising the « cheap-houses societies », and that the French Paris-Orleans Railway Company intends to take an increasing interest in the building and buying of houses by employees themselves under the conditions indicated in Section C. below.

In general, the administrations take a direct share in the provision and upkeep of the dwellings in question.

QUESTION 15. — *Do you consider that running special trains for the conveyance of the staff between their quarters and their work more economical and satisfactory than the providing of dwellings near their work? Is the use of these trains gratuitous to the staff, or is some rate fixed?*

It is not possible to draw a general conclusion from the replies received to this question, for the solution of the problem (the problem, that is, of whether it is more convenient to provide dwellings near to the place of work, or to convey the workmen from a distance) depends essentially on local conditions.

In view of the present cost of houses, the running of special trains is considered by some administrations as preferable from the point of view of economy, especially when the number of workmen to be conveyed is large.

On the other hand, from the point of view of the railway service, it is certainly preferable to build or buy houses near the place of work.

It would appear, therefore, reasonable to conclude that, if in many cases present conditions suggest the continuance of the system of conveying workmen by special train, these conditions may eventually change when, by reason of the

fall which may take place in the cost of construction, it becomes once more practicable to build.

SECTION C.

QUESTION 1. — *What effects has the war had on the plans for the development of construction of dwellings and on rents in the most important centres?*

QUESTION 2. — *Have laws been promulgated in your country to encourage, especially during and after the war, the initiative of the staffs belonging to public bodies in general, and railway companies in particular, and supply subsidies for the construction of their own dwellings?*

QUESTION 3. — *What sums have your company at their disposal to help in the construction of these houses?*

QUESTION 4. — *What are the sums that were allotted for this purpose up till 31 December 1920?*

The war caused everywhere, whether in the countries which took part in it, or in others, a great decrease in, or the complete cessation of building.

After the war building was recommenced; but principally because of the very high cost of materials and labour, and also in some cases because of the difficulty of obtaining materials, this re-beginning has been very slow, so that the number of new dwellings available is far below requirements.

The result of this state of things, and of the general increase in the cost of living, has been the universal raising of rents, sometimes to a very considerable degree.

In view of this fact, which might cause serious dissatisfaction among the people, the various Governments have considered it necessary to resort to legislative measures to control the raising of rents. In Belgium, two successive Acts allowed in the first place an increase not exceeding 30 %, and then an increase of 50 % on 1914 rents.

Similar measures have been taken in Spain, France, Italy, Great Britain, Norway and Holland.

In Denmark the increase of the rents of houses built before the war has been restricted by law within rather narrow limits, while for houses built during and after the war the increase in rent has been proportionate to the cost of construction. Thanks to these restrictions it has been possible so far to avoid the serious dissatisfaction which would have arisen in the absence of control.

Since, however, these restrictions can only be considered as temporary expedients, the Governments of some countries have tried to ease the housing crisis by encouraging building by special means.

We summarise below the information which has been furnished to us by the various administrations regarding the precedure adopted in this connection.

In France, even before the war, the « cheap-houses societies » and the building societies enjoyed special advantages; but with the Acts of the 24 October 1919 and 31 July 1920, by reason of which large sums were placed at the disposal of these societies, the latter have been able to continue and extend their operations, which had been suspended by the war.

These Acts are of a general character, and do not specially relate to employees in the public service.

As regards railway employees, the Paris-Orleans Railway Company states that formerly it encouraged, by means of loans or subsidies, various societies concerned in the construction of workmen's

houses, thus obtaining preferential treatment for its own employees in the allocation of houses.

Since 1920 the Company has adopted the policy of creating Building Societies, the advantages arising from which are reserved for the railway staff. Up to the present eleven such societies have been constituted, or are in course of formation, in the principal centres of the railway system.

The societies, founded in conformity with the law regulating cheap houses and small properties, will make it possible for employees to buy or build houses, by the granting, thanks to State subsidies, of loans repayable at a rate varying from 2 1/4 % to 3 1/2 % according to the family expenses.

These societies are managed by active or retired officials of the Company. Further, the Company undertakes the preparation of plans for the houses, and offers its employees a reduced rate for the carriage of materials.

In France also the Midi Railway Company is at present considering the question of the foundation of a Building Society, the operations of which would be limited to buildings undertaken by employees of the Company.

The Great Eastern Railway Company of England reports that a society has been formed (The Great Eastern Railway Investment and Permanent Building Society) with the object of affording facilities to employees who desire to purchase the houses which they occupy.

In Italy laws have been passed since the war which afford facilities to the co-operative societies formed by the State employees with the object of building cheaper houses. By virtue of these laws the Administration of the State Railways has been able to advance loans to the co-operative societies formed by its employees. These loans, up to the 31 December 1920, amounted to 275 million lire, and they are made as a general rule on a basis sufficient to cover the complete construction of the houses. A quite recent law has made it possible for the Administration almost to double this sum.

On the capital in question, the co-operative societies pay interest at the rate of from 3 3/4 to 4 %, but in view of the present very high cost of building, the State, in order to keep the amount of such interest within reasonable limits, provides an annual contribution at the rate of from 2 1/2 to 2 3/4 % of the capital invested.

These co-operative societies also enjoy the advantage of being able to transport materials by railway at reduced rates, and of obtaining the supply of materials from the administration on favourable terms.

Further, the houses built by these co-operative societies are exempt from taxation for 20 years.

In Norway also the State affords considerable facilities to those of its employees who desire to build their own houses.

The help of the State in this case takes the form either of subsidies or loans at low rates of interest and with reasonable conditions of re-payment.

The loans advanced do not exceed 90 % of the net cost of construction; the subsidies referred to have amounted to 40 % of this cost, and as a rule do not exceed the sum of 12 000 crowns.

These facilities have enabled many railway employees to build their own houses.

The Administration of the State Railways has at its disposition a sum of about 19 million crowns borrowed from the Pensions Fund. Out of this sum loans

have been granted to the amount of 8 million crowns, divided among about 1 300 employees, and subsidies amounting to 1 500 000 crowns divided among about 170 employees.

In Holland the housing law of 1901 has made possible the formation of societies subsidised by the State, which devote themselves exclusively to the construction of working class houses.

In certain localities where a large number of railway employees reside, these societies have been instituted by the employees themselves.

Under the above-mentioned law the State makes advances for the construction of houses. Rents are fixed as far as possible in relation to the wages of the occupants, and if the rent is less than the yearly cost, the State pays 75 % of the excess as an emergency housing subsidy and the Commune pays the remaining 25 %.

In order to obtain a certain number of houses the railways have interested themselves in these societies in several ways, for example by contributing to the share capital; by making advance payments to accelerate construction without waiting for the subsidies to be made by the State; by granting a premium on all houses allotted to railway employees; and finally by paying a part of the emergency housing subsidy.

In Sweden, under a decree issued in 1920, subsidies for the construction of houses can be granted by the State in the form of loans or of constructions without obligation either as regards interest or repayment; but these advantages are not confined exclusively to State employees.

As regards the particular case of the State Railways, employees, the Government, in 1920, gave the railway administration the power to grant building land to the permanent staff (though only in one locality, near to the station of Notwiken) for the construction of houses, and to make loans up to a maximum of 18 000 crowns per house.

In Switzerland the Confederation, the Cantons and the Communes have granted sinking fund subsidies for the construction of houses, of which railway employees can take advantage equally with the rest of the population.

Further, for several years the Administration of the Federal Railways has placed at the disposal of those of its employees who desire to buy or build houses, grants from the Pensions and Benevolent Fund in the form of mortgage loans.

Up to the 31 March 1921 there had been granted to individual employees 850 such loans, to the amount of 13 462 000 fr., and to employees' societies 32 loans amounting to 4 666 000 fr.

QUESTION 5. — *Have these funds been placed at the disposal of the staff without distinction of class; and eventually what restrictions have been prescribed?*

In Italy and in Holland the facilities mentioned for the construction of houses are available for employees without distinction of grade.

In France, since mortgage loans can only be granted legally in needy cases, the Paris-Orleans Railway Company confines these loans to the lower and middle grade employees.

QUESTION 6. — *Have you limited the number of rooms which these dwellings may contain?*

In France, the regulation of the number of rooms which the houses may contain is fixed by the legislature which

also fixes the rent value and the net cost of the so-called cheap houses.

In Italy, according to the rules laid down for the cheap houses, no house may contain more than 10 rooms.

In Norway, no limitation has been placed on the number of rooms; but it is to be noted that the mortgage loans are generally granted only for small houses, and that subsidies are not granted for buildings the floor area of which exceeds 125 m^2 (150 square yards).

In Sweden also there is no limitation to the number of rooms; but, since the total of the loans is limited to 18 000 crowns, the construction of small houses is encouraged.

QUESTION 7. — *What are the arrangements in force for repayment to your company of the loans advanced?*

In the case of the employees of the Italian State Railways the interest and loan repayment charges on the sums borrowed are deducted from wages; repayment must be completed within a maximum of 50 years.

In Norway the period for repayment of loans is fixed at from 35 to 45 years, and in France at only 25 years.

QUESTION 8. — *What is the general experience of your company from economical, social and administrative points of view in respect to finding for their employees suitable housing conditions?*

The question of facilitating the building of houses for employees who are not obliged to live in the vicinity of the railway is peculiar to the general problem arising out of the scarcity of houses, which at present is making itself felt to a greater or less degree in almost every country. If the Governments and local authorities succeeded in solving this problem by relieving the difficulties at present experienced everywhere, it may be said that the question would no longer concern the railways. But, since it is to be anticipated that this stage will not be reached for a long time to come, some administrations have devoted their attention to assist in solving the problem, as will be seen from the replies which have been given to the latter part of the questionnaire.

These replies show also that these attempts have only been undertaken recently, so that it is yet too early to draw definite conclusions as to the general results of the efforts made.

In any case, however, it is clear that the greater comfort secured by employees who have obtained houses of their own will also prove to be in the interests of the railway service.

As regards the methods adopted by the various administrations to attain this object special consideration should be given to the procedure adopted by the Paris-Orleans Railway Company, which consists in the granting of subsidies and facilities to Building Societies and even in the formation of new societies, which, by assuming responsibility for the provision of the houses in question, relieve the railway administration of this task. This is a method also of ensuring that the administrations shall not be burdened with future commitments out of proportion to the necessities of the service, and which may considerably nullify their activities.

APPENDIX.

The following railways have sent answers to the list of questions; the following numbers and abbreviations are used for their names.

NAMES OF RAILWAYS.	NUMBERS AND ABBREVIATIONS.
BELGIUM. — State Railways	1. E. B.
National light Railways Company	2. V. B.
DENMARK. — State Railways	3. E. D.
SPAIN — Northern Railways	4 N. E.
FRANCE. — East Railways.	5. F. East
Midi Railways.	6. M. F.
Paris-Orleans Railways.	7. P. O.
Paris-Lyons-Mediterranean Railways	8. P. L. M.
French State Railway	9. F. St.
GREAT BRITAIN. — Glasgow & South Western Railway	10 G & S. W.
Great Central Railway.	11. G. C.
Great Eastern Railway.	12. G. E.
Great Western Railway	13. G. W.
Lancashire & Yorkshire Railway	14. L. Y.
London & South Western Railway.	15. L. S. W.
GREECE. — Greek State Railways	16. E. G.
ITALY. — State Railways	17. E. I.
Venetian Society for the construction and working of secondary railways in Italy	18. V. I.
LUXEMBURG. — Prince Henry Railways & Mine Railways	19. P. H.
NORWAY. — State Railways	20. N. St.
HOLLAND. — Netherlands State Railways	21. D. St.
PORTUGAL. — Portuguese State Railways	22. E. P.
SWEDEN. — State Railways.	23. E. S.
Bergslagen Railways	24. B.
SWITZERLAND. — Federal Railways	25. F.
ALGERIA. — Algerian State Railways	26. A. E.
INDIAN EMPIRE. — Bengal Nagpur Railway Company	27 B. N.
Great Indian Peninsula Railway Company	28. G. I.
Madras & Southern Mahratta Railway	29. M. S. M.
Oudh & Rohilkhand Railway.	30. O. R.
SOUTH AFRICA. — South African Railways and Harbours	31. S, Afr.
AUSTRALIA. — South Australia Government Railways	32. S. Aust.

CHAPTER A.

Staff lodged within the boundaries or dependencies of the railway owing to the exigencies, or in the interest, of the service.

QUESTION 1. — *What classes of railway employees are lodged owing to the exigencies, or in the interests of the service, in dwellings provided by the administration or railway company, and situated within the precincts of or near the railway premises? Belonging to :*

a) *The Engineer's Department;*
b) *The Locomotive, Carriage and Wagon Departments;*
c) *The Traffic Department?*

Belgium.

1. *E. B.* — *a*) Foremen platelayers, cabinmen, switch attendants, block operators, gate keepers (men and women) foremen detonator placers, foremen of gangs and workmen.

Almost all formen platelayers and all women gate keepers.

b) No employees lodged, with two or three exceptions.

c) Stationmasters and local stationmasters.

2. *V. B.* — *a*) Nil.

b) Nil.

c) Chief service officials, locomotive foremen, stationmaster.

Denmark.

3. *E. D.* — *a*) Gate-keepers.

b) Head guards.

c) Stationmasters; some clerks.

Spain.

4. *N. E.* — *a*) Foremen platelayers, gang foremen, head workmen, gate-keepers (men or women), night watchmen, and many workmen being husbands or fathers of gate-keepers.

b) Locomotive foremen, and reserve foremen.

c) Chief and sectional inspectors, head and assistant stationmasters, and chief overseers.

France.

5. *F. East.* — *a*) Women gate-keepers, and non-permanent women semaphore signallers.

b) Reserve foremen, head and assistant locomotive foremen.

c) Head and assistant stationmasters of principal and local stations, and employees at halts.

6. *M. F.* — *a*) Women gate-keepers, certain platelayers and foremen platelayers.

b) Head and assistant locomotive foremen and reserve foremen.

c) Head and assistant stationmasters of principal and local stations and halts; caretakers.

7. *P. O.* — *a*) Semaphore operators, women gatekeepers, sectional and district foremen, foremen and assistant foremen platelayers, auxiliary gate-keepers, platelayers and similar grades, technical supervisors (where accommodation available).

b) Head and assistant locomotive foremen, reserve foremen.

c) Head and assistant stationmasters of principal and local stations and halts.

8. *P. L. M.* — *a*) Women gatekeepers on intermittent service.

b) Locomotives : foremen and assistant foremen, reserve foremen; carriage and wagon : foremen and assistant foremen of workshops; restaurants, etc. : a certain number of inspectors, storekeepers, and overseers.

c) Head and assistant stationmasters of principal and local stations and halts.

9. *F. St.* — *a*) Gate-keepers, semaphore operators, and caretakers.

b) Head and assistant locomotive foremen, and reserve foremen.

c) Head and assistant stationmasters of principal and local stations and halts; heads and assistants of luggage and cartage depot.

The staff at halts, caretakers and pointsmen of isolated posts.

Great Britain.

10. *G. & S. W.* — *a*) Surfacemen.

b) Drivers, firemen, engineers, fitters, etc.

c) Stationmasters, porters, signalmen, guards.

11. *G. C.* — *a*) So far as the engineers' department is concerned we hardly think we can be said to have any men who are lodged as described in the question, although we have at various parts of the line, platelayers, signal linemen, and others living in houses which have been provided by the company with a view to enabling certain of the staff to live near their work. We have also platelayers at different parts of the line living in the company's gate-houses.

b) The only men we have who have been found lodging accommodation on the company's premises, other than those who, after working trains are required to lodge away from their home station, are ten men who have been allowed accommodation in the dormitories on account of their not being able to find other accommodation. We have also six men who have been transferred from one depot to another, and on account of their not being able to find accommodation are paid a lodging allowance of 10 s. 6 d. per week.

c) Where the company own property the houses are generally let irrespective of grade, but in some cases not, such as a gate-house or a station-house.

12. *G. E.* — *a*) Platelayers and gangers.

c) Stationmasters, gate-keepers, foremen-in-charge.

13. *G. W.* — *a*), *b*), *c*) A hostel has been established by the company at Severn Tunnel Junction where lodging and food are provided for train crews, *i. e.* :

Locomotive department : enginemen, firemen.

Traffic department : goods guards, brakesmen.

Lodgings are also provided for female staff in the hotels and refreshment rooms department.

Houses are also provided at certain places close to the railway premises for the accommodation of certain members of the traffic department staff, principally stationmasters, signalmen, and crossing-keepers, but this is not done as a matter of principle.

14. *L. Y.* — *a*) Platelayers, 143; joiners, 5; labourers, 17; total, 165.

b) Locomotive foremen, 9; drivers, 35; firemen, 10; cleaners, 8; fitters, 34; labourers, 17; total, 113.

c) Stationmasters and agents, 188; porters, 32; pointsmen, 102; shunters, 11; guards, 34; gate-keepers, 30; inspectors and collectors, 26; horse-keepers and carters, 19; wagon examiners, 25; total 467.

15. *L. S. W.* — *a*) Permanent way, signal, and telegraph men, where premises available.

b) Firemen and auxiliary firemen.

c) Stationmasters, signalmen, porters.

Greece.

16. *E. G.* — *a*), *b*), *c*) On the Macedonian lines, the personnel of the external service is lodged, *i.e.* :

Chief engineer, sectional and district superintendents, foremen, under-foremen and workmen of gangs, flagmen. On other lines of the system, inspectors, foremen, under-foremen and workmen of gangs, flagmen.

Italy.

17. *E. I.* — *a*) Inspectors, foreman platelayers flagmen, gate-keepers, platelayers also lodged when accommodation available.

b) Locomotive foremen and assistants. The following also lodged when accommodation available, employees engaged on ventilation of tunnels, drivers and firemen attached to water reservoir service.

c) Stationmasters and assistants, local stationmasters, foremen pointsmen, pointsmen, block signalmen. Shunters also lodged when accommodation available.

18. *V. I.* — *a*) Inspectors, foremen platelayers and platelayers.

c) Stationmasters and assistants, local stationmasters pointsmen, and women gate-keepers.

Luxemburg.

19. *P. H.* — *a*) Head of the service, and a certain number of foremen labourers flagmen and gate-keepers.

b) Head of the service.

c) Head of the service, stationmasters and a certain number of local stationmasters and of porter-pointsmen.

Norway.

20. *N. St.* — *a*) Superintendents of the line and flagmen.

c) District superintendents and stationmasters. Part of the station staffs, especially unmarried telegraphists.

Holland.

21. *D. St.* — *a*) Inspectors, signalmen, block-signalmen, junction staffs, bridge staffs, labourers, gate-keepers, foremen of gangs, gangmen, drivers.

b) Locomotive department, only some employees of the inspection staff. Carriage and wagon department and workshops only in certain cases the chief workshops engineer, storekeepers and workshop caretakers.

c) Stationmasters and local stationmasters, gate-keepers, messengers and caretakers.

Portugal.

22. *E. P.* — *a*) Detonator placers, gang-foremen, foremen platelayers, gate-keepers and flagmen.

b) Some drivers and firemen, locomotive foremen, engine foremen, etc.

c) Station staffs.

22. *E. P.* (Minho and Douro Administration). — *a*) Section foremen, foremen of detonator placers and gang foremen.

b) Locomotives inspectors and sub-inspectors, locomotive foremen, and under foremen.

c) Stationmasters and assistants, ticket collectors, office staff, porters and telegraphists.

Sweden.

23. *E. S.* — *a*), *b*), *c*) If the management considers it necessary :

District superintendents;

Superintendent of the line, engineers of the line, telegraph engineers;

Locomotive superintendents, engineers and inspectors;

Traffic superintendents and inspectors, higher stationmasters, office staff, stationmasters and assistant stationmasters, luggage office employees, station assistants, etc.;

All lower grade employees of the line, except drivers, head guards, unmarried male office staff, and married staff of the same class who are not on regular external service, etc.;

Foremen and men of « Guard-service » under the « Royal Administration »;

When local conditions require and permit, other employees are lodged.

24. *B.* — *a*) All flagmen.

c) Stationmasters only.

Switzerland.

25. *F.* — *a*) District superintendents, foremen platelayers, flagmen, gate-keepers.

b) Locomotive foremen, workshop caretakers.

c) Stationmasters and assistants, pointsmen.

Algeria.

26. *A. E.* — *a*) Superintendents of subdivisions, line inspectors, foremen platelayers, and gate-keepers, platelayers and labourers.

b) Locomotive foremen and under-foremen, and reserve foremen.

c) Head and assistant stationmasters of principal and local stations and halts; superintendents and assistant superintendents of luggage and carriage depots.

Indian Empire.

27. *B. N.* — *a*), *b*), *c*) All grades, with the exception of a certain number of clerks at Headquarters.

28. *G. I.* — *a*) Permanent-way inspectors and sub-inspectors, inspector of works, bridge inspectors, masonry and iron-work inspectors, overseers, platelayers, gangmen, linemen, watchmen, messengers, interlocking maintenance staff, etc.

b) Steam pumpers, watch and ward staff, fire brigade staff, electricians examining staff, etc.

c) Telegraph overseers, electricians, traffic

inspectors, all traffic station staff, gate-keepers, block signalmen, signallers, etc.

29. *M. S. M.* — *a*) Engineers, permanent-way inspectors, signal inspectors, and their assistants. Some gangmen, artisans and clerks in special cases where it is difficult to find lodgings in the neighbourhood of the place of work.

b) As far as possible drivers, firemen, shunters examiners, fitters, several classes of workmen, cleaners, watchmen, etc.

c) Traffic inspectors, stationmasters, assistant stationmasters, signalmen, block operators, etc.

30. *O. R.* — *a*) All inspectors and sub-inspectors gangmen, watchmen, and gate-keepers, and a proportion of fitters, blacksmiths, and carpenters.

b) At the smaller stations all the staff is lodged in railway quarters. At the larger, only running and shed staffs, carriage examining staff, watchmen, and European mechanics in shops are lodged.

c) At the smaller stations all the traffic staff. At the larger all the station staff other than ticket collectors and a proportion of the running staff.

South Africa.

31. *S. Afr.* — *a*) Gangers, permanent-way gangs, and permanent-way inspectors.

b) Drivers and firemen.

c) Stationmasters, station foremen, station inspectors and guards.

Australia.

32. *S. Aust.* — *a*) The whole of the maintenance staff.

b) Nil.

c) In rare cases.

QUESTION 2. — *Is the lodging of the above classes of employees and workmen in buildings belonging to the railway company always allowed free?*

Belgium.

1. *E. B.* — Yes, for local stationmasters, and employees of the engineer's department.

2. *V. B.* — Yes.

Denmark.

3. *E. D.* — Moderate rent, calculated on salary (1/8 of salary plus 1/2 of lodging supplement).

Spain.

4. *N. E.* — Yes.

France.

5. *F. East.* — Yes.

6. *M. F.* — Yes, except for platelayers and foremen platelayers under *a*.

7. *P. O.* — Yes.

8. *P. L. M.* — Yes, for the line, locomotive and traffic staffs.

No, for the carriage and wagon department and restaurant staffs.

9. *F. St.* — Yes (for the line service) as regards caretakers, gate-keepers, non-permanent semaphore operators.

Yes (for the locomotive service) as regards head and assistant locomotive foremen.

Yes (for the traffic service) as regards the employees named in answer No. 1, with the exception of station-caretakers and pointsmen who pay rent.

Great Britain.

10. *G. & S. W.* — No.

11. *G. C.* — No, but in a few cases the rent charged for gate-houses is only nominal.

12. *G. E.* — Gate-keepers reside free, stationmasters and others pay rent.

13. *G. W.* — One shilling per night is charged for lodging accommodation in the hostel. Female staff in the hotels and refreshment rooms department is lodged free. Rent is always charged for company's houses.

14. *L. Y.* — No.

15. *L. S. W.* — No.

Italy.

17. *E. I.* — No, a small rent is deducted from wages.

18. *V. I.* — Yes.

Luxemburg.

19. *P. H.* — Lodging is not free but the rent is low.

Norway.

20. *N. St.* — No.

Holland.

21. *D. St.* — No, the payment is 1/10 of the salary.

Portugal.

22. *E. P.* — Yes.

22. *E. P.* (Minho and Douro Administration). — Yes.

Sweden.

23. *E. S.* — No.

24. *B.* — Yes, to stationmasters.

Switzerland.

25. *F. V.* — No.

Algeria.

26. *A. E.* — Yes, to women gate-keepers, and regular or semi-permanent semaphore signallers, and to all employees of other branches of the service.

Indian Empire.

27. *B. N.* — No.

28. *G. I.* — Yes.

29. *M. S. M.* — Engineer's department district and assistant engineers pay rent. Permanent-way inspectors, inspectors of signals and their assistants, gangmen and artisans live rent free. Locomotive carriage and wagon department : No, except for watchmen. Traffic department : Yes.

30. *O. R.* — Yes.

South Africa.

31. *S. Afr.* — Permanent-way gangs, subgangers, stationmasters, station foremen, and station inspectors are entitled to free quarters under the terms of service. The Kaffir and Indian labourers are usually provided with free housing.

Australia.

32. *S. Aust.* — No.

QUESTION 3. — *In case of insufficiency of rooms to lodge any of the employees mentioned in paragraph 1, does your company make an allowance so that they may find quarters elsewhere near their work?*

Belgium.

1. *E. B.* — Yes, for stationmasters and local stationmasters.

2. *V. B.* — No.

Denmark.

3. *E. D.* — See answer to question 2.

Spain.

4. *N. E.* — Yes, to grades *b* and *c*.

France.

5. *F. East.* — Yes.

6. *M. F.* — Yes, to employees named in No. 1, except the grades given under *a*.

7. *P. O.* — Yes, except for line service.

8. *P. L. M.* — Yes, for the line, locomotive and traffic staffs.

No, for the carriage and wagon department and restaurant staffs.

9. *F. St.* — Yes for a certain number of assistant stationmasters and head and assistant locomotive foremen.

Great Britain.

10. *G. & S. W.* — No.

11. *G. C.* — No, as regards traffic department. Under certain conditions lodging allowance made to men in engineer's department.

12. *G. E.* — Expenses are allowed in cases where men are removed and are unable to obtain housing accommodation.

13. *G. W.* — Except in the cases mentioned in column 1 the men are left to find quarters for themselves. Train crews and restaurant and sleeping car staff, whose turns necessitate their lodging away from their home sta-

tions, are made lodging allowances. A special allowance is made to staff permanently transferred from one place to another, who experience difficulty in obtaining accommodation owing to the housing shortage, to meet the enhanced cost of lodging until they are able to find a house.

14. *L. Y.* — Yes.

15. *L. S. W.* — In a few special cases only.

Italy.

17. *E. I.* — Yes.

18. *V. I.* — Yes.

Luxemburg.

19. *P. H.* — No.

Norway.

20. *N. St.* — Yes.

Holland.

21. *D. St.* — No.

Portugal.

22. *E. P.* — Yes.

22. *E. P.* (Minho and Douro Administration). — Engineer's department, no. Locomotive, carriage and wagon department, yes, but only to locomotive foremen and under foremen. Traffic department, yes.

Sweden.

23. *E. S.* — No.

Switzerland.

25. *F.* — No.

Algeria.

26. *A. E.* — Yes, for the locomotive and traffic departments. No, for the line service.

Indian Empire.

27. *B. N.* — No.

28. *G. I.* — Yes.

29. *M. S. M.* — Engineer's department : Yes, in the case of permanent-way inspectors, inspectors of signals and their assistants. Locomotive carriage and wagon department : No, with several exceptions. Traffic department : Yes.

30. *O. R.* — Yes.

South Africa.

31. *S. Afr.* — Yes.

Australia.

32. *S. Aust.* — No.

QUESTION 4. — *What is the amount of this allowance?*

Belgium.

1. *E. B.* — For stationmasters, varying according to locality; for local stationmasters 600 fr.

Spain.

4. *N. E.* — From 300 to 2 600 pesetas per annum.

France.

5. *F. East.* — 10 % of remuneration.

6. *M. F.* — 10 % of the total remuneration counting for pension. In the case of women gatekeepers, the amount of rent.

7. *P. O.* — 10 % of fixed remuneration.

8. *P. L. M.* — Line service, 300 fr. per annum. Locomotive service, 10 % (remuneration and premiums). Traffic service, 10 % of all remuneration counting for pension.

9. *F. St.* — 1/10 of the total remuneration counting for pension.

Great Britain.

11. *G. C.* — For workmen of the engineer's department the usual lodging allowance is 3 s. per day and night.

13. *G. W.* — Enginemen, firemen, and guards, 3 s. 6 d. to 4 s. per day. Restaurant car staff, 2 s. per night. Sleeping car staff, 3 s. per night.

The allowance varies from 2 s. to 7 s. 6 d. per day.

14. *L. Y.* — 3 s. per night.

15. *L. S. W.* — Variable according to circumstances.

Italy.

17. *E. I.* — Varies between 10 and 30 l. per month.

18. *V. I.* — Varies between 7.50 and 30 l. per month.

Portugal.

22. *E. P.* — Varies according to locality, and grade.

22. *E. P.* (Minho and Douro Administration). — Locomotive, carriage and wagon department 8 escudos per month. Traffic department varies according to grade of employee, between 1.5 and 10 escudos.

Algeria.

26. *A. E.* — 10 % of the amount of remuneration counting for pension.

Indian Empire.

28. *G. I.* — 10 % of pay, provided the allowance itself does not exceed the amount actually paid as house rent. At Bombay the allowance is 20 % of pay under the same conditions.

29. *M. S. M.* — Engineer's department, 10 % of remuneration. Locomotive department, 6.25 % of remuneration. Traffic department; from 10 to 15 % of remuneration, up to a maximum of 25 rupees.

30. *O. R.* — 10 rupees per month where salary is not less than 50 rupees. 5 rupees per month where salary is less than 50 rupees but exceeds 15 rupees. In special cases this allowance may be increased by 50 %.

South Africa.

31. *S. Afr.* — One-sixth of their pay to those entitled to free quarters.

QUESTION 5. — *What is the total mileage of the system worked by your company?*

Belgium.

1. *E. B.* — 4 616 km.

2. *V. B.* — 2 000 km.

Denmark.

3. *E. D.* — 2 108 km.

Spain.

4. *N. E.* — 3 592 km. of normal gauge, 100 km. of narrow gauge.

France.

5. *F. East.* — 5 027 km.

6. *M. F.* — 4 098 km.

7. *P. O.* — 7 655 km.

8. *P. L. M.* — 9 795 km.

9. *F. St.* — 3 700 km. double track; 5 300 km. single track.

Great Britain.

10. *G. & S. W.* — 793 km. (or 1 873 km. including secondary lines).

11. *G. C.* — 1 370 km.

12. *G. E.* — 1 714 km.

13. *G. W.* — 4 823 km.

14. *L. Y.* — 968 km.

15. *L. S. W.* — 1 556 km., owned, leased, or worked. 222 km. owned, leased, or worked with other companies.

Italy.

17. *E. I.* — 16 249 km.

18. *V. I.* — 596 km.

Luxemburg.

19. *P. H.* — 181 km. of normal gauge. 67 km. of narrow gauge.

Norway.

20. *N. St.* — 2 820 km.

Holland.

21. *D. St.* — 3 690 km.

Portugal.

22. *E. P.* — 816 km.

22. *E. P.* (Minho and Douro Administration). — 494 km.

Sweden.

23. *E. S.* — 5 582 km.

24. *B.* — 496 km.

Switzerland.

25. *F.* — 2 882 km.

Algeria.

26. *A. E.* — 2 511 km.

Indian Empire.

27. *B. N.* — 4 094 km.

28. *G. I.* — 5 022 km.

29. *M. S. M.* — 1 736 km. of normal gauge. 3 126 km. of narrow gauge. Total, 4 862 km., not counting 727 km. of secondary line.

30. *O. R.* — Normal gauge, 2 424 km.; narrow gauge, 106 km.; total, 2 530 km.

South Africa.

31. *S. Afr.* — 18 471 km.

Australia.

32. *S. Aust.* — 5 040 km.

QUESTION 6. — *What is the effective total number of workmen employed on your railway, and how many per mile?*

Belgium.

1. *E. B.* — *a*) 93 253.
b) 20.2.

2. *V. B.* — *a*) 4 900.

Denmark.

3. *E. D.* — *a*) 16 714.
b) 7.3.

Spain.

4. *N. E.* — *a*) 33 345.
b) 9.

France.

5. *F. East.* — *a*) 65 500.
b) 13.

6. *M. F.* — *a*) 35 324.
b) 8.6.

7. *P. O.* — *a*) 69 000.
b) 9.

8. *P. L. M.* — *a*) Line service, 22 319; locomotive, carriage and wagon departments, 34 414; traffic department, 56 369.
b) 2.3, 3.5, 5.7.

9. *F. St.* — *a*) Line service, 19 272; locomotive, carriage and wagon departments, 30 558; traffic department, 41 820.
b) 2.23, 3.54, 4.84.

Great Britain.

10. *G. & S. W.* — *a*) 12 142.
b) 15.3 (or 6.5 including secondary lines).

11. *G. C.* — *a*) Traffic department, about 8 500; engineer's department, 3 985.

12. *G. E.* — *a*) 22 206.
b) 12.9.

13. *G. W.* — *a*) 85 654 including hotels and refreshment rooms department female staff.
b) 17.7.

14. *L. Y.* — *a*) 44 948.
b) 46.4.

15. *L. S. W.* — *a*) Engineer's department, 6 000; locomotive, carriage and wagon department, 8 970. Traffic department 8 500.
b) 3.4, 5.0, 4.7.

Italy.

17. *E. I.* — *a*) 226 150.
b) 13.9.

18. *V. I.* — *a*) 2 320.
b) 3 89 without counting 438 women gatekeepers.

Luxemburg.

19. *P. H.* — *a*) 2 275.
b) 9.2.

Norway.

20. *N. St.* — *a*) About 9 300.
b) 3.3.

Holland.

21. *D. St.* — *a*) 43 872.
b) 12.

Portugal.

22. *E. P.* — *a*) Engineer's locomotive and traffic departments, 4 324; total, 4 810.
b) 6.

22. *E. P.* (Minho and Douro Administration). — *a*) Engineer's department, 1 693.

Locomotive, carriage and wagon departments, 435. Traffic department, 2 800.
b) 3.5; 1.1; 5.7.

Sweden.

23. *E. S.* — *a*) 37 581.
b) 6.7.

24. *B.* — *a*) 2 802.
b) 5.6.

Switzerland.

25. *F.* — *a*) 39 410.
b) 13.6.

Algeria.

26. *A. E.* — *a*) 9 170.
b) 3.6.

Indian Empire.

28. *G. I.* — *a*) 114 915.
b) 20.4.

29. *M. S. M.* — *a*) Engineer's department, 15 113; locomotive department, 18 484; excluding superintending and office staff (907); traffic department, 9 980.
b) 3.1; 3.8.

South Africa.

31. *S. Afr.* — *a*) 86 219, *viz:* salaried staff, 9 066; artizans and skilled labourers, 9 371; running staff (drivers, firemen and guards), 4 999; other European employees, 19 279; coloured Kaffir and Indian labourers, 43 504.
b) 4.7.

Australia.

32. *S. Aust.* — *a*) 1 930 workmen.

QUESTION 7. — *How many employees are lodged in buildings provided by the company?*

Belgium.

1. *E. B.* — Engineer's department, 3 305; locomotive department, 3; traffic department, 808.

Denmark.

3. *E. D.* — About 900.

Spain.

4. *N. E.* — 3 942 on the 1 January 1920.

France.

5. *F. East.* — About 3 600.

6. *M. F.* — 3 942.

7. *P. O.* — 7 433.

8. *P. L. M.* — Line service, about 5 000; locomotive, carriage and wagon departments and restaurant staffs, 779; traffic department, no figures.

9. *F. St.* — Line service, 5 067; locomotive service, 87; traffic department, 1 824.

Great Britain.

10. *G. & S. W.* — 1 146 houses occupied by employees.

11. *G. C.* — Number is constantly varying.

12. *G. E.* — Traffic department, 1 200. Engineer's department, 460.

13. *G. W.* — 30 men can be lodged in the Severn Tunnel Junction hostel at one time. 401 members of hotels staff are lodged in buildings provided by the company.

14. *L. Y.* — 745.

Italy.

17. *E. I.* — 18 926.

Luxemburg.

19. *P. H.* — 154.

Norway.

20. *N. St.* — About 800.

Holland.

21. *D. St.* — Engineer's department 2 200; traffic department, 415.

Portugal.

22. *E. P.* — 1 059.

22. *E. P.* (Minho and Douro Administration). — Engineer's department, 504. Locomotive, carriage and wagon department, 11; traffic department, 425.

Sweden.

23. *E. S.* — About 6 400.

24. *B.* — 514.

Switzerland.

25. *F.* — 2 635.

Algeria.

26. *A. E.* — 1 050.

Indian Empire.

27. *B. N.* — All.

29. *M. S. M.* — Engineer's department, 2 311; locomotive department, 2 185.

South Africa.

31. *S. Afr.* — 11 165 European staff, and practically all the Kaffir and Indian labourers. 3 738 of the European staff have free quarters, and 7 427 pay rent.

Australia.

32. *S. Aust.* — 1 300.

QUESTION 8. — *What is the number of employees to whom the company allows lodging out expenses as per question No. 3 above?*

Belgium.

1. *E. B.* — Stationmasters, 182; local stationmasters, 77.

Spain.

4. *N. E.* — About 500.

France.

5. *F. East.* — 700.

6. *M. F.* — Employees who receive 10 % allowance, 152; women gatekeepers, 21.

7. *P. O.* — 586.

8. *P. L. M.* — Line service, 50; locomotive service, 72; traffic department, no figures.

9. *F. St.* — Line service, nil; locomotive service, 138; traffic department, 624.

Great Britain.

10. *G. & S. W.* — Nil.

11. *G. C.* — Lodging allowances paid under certain conditions to employees of the engineer's department.

12. *G. E.* — This number varies according to the amount of housing accommodation.

13. *G. W.* — 1 453.

14. *L. Y.* — 27.

15. *L. S. W.* — Only a few such cases.

Italy.

17. *E. I.* — 11 744.

Norway.

20. *N. St.* — Such cases are rare.

Portugal.

22. *E. P.* — 82.

22. *E. P.* (Minho and Douro Administration). — Locomotive, carriage and wagon departments, 4; traffic department, 104.

Indian Empire.

29. M. S. M. — Engineer's department, 34; locomotive department, 95.

South Africa.

31. *S. Afr.* — 316.

QUESTION 9. — *Has your company or administration, in order to curtail working expenses, and particularly to reduce that sum on its budget for lodging out purposes, recently adopted measures, or is taking them into actual consideration to reduce the number of its employees?*
In this case please furnish some particulars of these measures and plans.

Belgium.

1. *E. B.* — Reduction of attendance at level crossings; suppression of flagmen except at most dangerous parts of line.

Denmark.

3. *E. D.* — Cheaper types, simpler arrangement of dwellings, etc.

France.

7. *P. O.* — The extension of the use of mechanical apparatus and appliances, and of the automatic block installation at present under consideration.

8. *P. L. M.* — No.

Great Britain.

10. *G. & S. W.* — No.

11. *G. C.* — Traffic department, yes, but not particularly as regards housing. Engineer's department, no.

12. *G. E.* — No.

13. *G. W.* — Every effort is made to arrange turns of duty so that as few men as possible are required to sleep away from their home stations.

15. *L. S. W.* — Yes.

Italy.

17. *E. I.* — Suppression of attendance at level crossings except at the most dangerous spots; reduction of the number of flagmen.

18. *V. I.* — No.

Holland.

21. *D. St.* — No.

Portugal.

22. *E. P.* (Minho and Douro Administration). — No.

Sweden.

23. *E. S.* — No.

24. *B.* — No.

Switzerland.

25. *F.* — No.

Algeria.

26. *A. E.* — No.

Indian Empire.

27. *B. N.* — No.

28. *G. I.* — No.

29. *M. S. M.* — No.

30. *O. R.* — No.

South Africa.

31. *S. Afr.* — No.

Australia.

32. *S. Aust.* — No.

QUESTION 10. — *Has your company, in the interest of the service, any intention of increassing the size or number of lodging houses within the precincts or in proximity of the railway premises?*

Belgium.

1. *E. B.* — No.

2. *V. B.* — No.

Denmark.

3. *E. D.* — No.

Spain.

4. *N. E.* — The only dwellings of this class at present built are in the mining regions of the Asturias, and in auxiliary stations at a distance from towns.

France.

5. *F. East.* — No.

6. *M. F.* — No.

7. *P. O.* — Yes.

8. *P. L. M.* — No, for the line and traffic services.

Yes, for the locomotive, carriage and wagon departments.

9. *F. St.* — Yes.

Great Britain.

10. *G. & S. W.* — No.

11. *G. C.* — No.

12. — *G. E.* — No.

13. *G. W.* — No.

14. *L. Y.* — Only where absolutely imperative.

15. *L. S. W.* — No.

Italy.

17. *E. I.* — No.

18. *V. I.* — No.

Norway.

20. *N. St.* — Yes.

Holland.

21. *D. St.* — No.

Portugal.

22. *E. P.* — Yes.

22. *E. P.* (Minho and Douro Administration). — Yes.

Sweden.

23. *E. S.* — No.

24. *B.* — No.

Switzerland.

25. *F.* — No.

Algeria.

26. *A. E.* — Yes.

Indian Empire.

27. *B. N.* — Number of lodgings to be increased according to expansion of line.

28. *G. I.* — Yes.

29. *M. S. M.* — Yes.

30. *O. R.* — Yes.

CHAPTER B.

Staff to which the railway company furnishes lodging expenses, though not obliging the recipients to live within the boundaries, of, or near the railway.

QUESTION 1. — *Does your company arrange to find living quarters for any of its staff not included in the heading A above; this being the case, what are the classes of employees in :*

a) *The Engineer's Department;*
b) *The Locomotive, Carriage and Wagon Departments;*
c) *The Traffic Department that have this privilege?*

Belgium.

1. *E. B.* — *a*) Yes, in the devastated regions, and where dwellings were lacking.

All grades of employees are eligible for these dwellings.

Denmark.

3. *E. D.* — *a*), *b*), *c*) Yes, where circumstances require it. All classes of employees are eligible for these dwellings.

Spain.

4. *N. E.* — The company has built special dwellings, and has utilised unoccupied buildings, converting them into dwellings for employees of the following grades :

a) Sectional superintendents, and assistant superintendents of the line, and administrative staff.

b) Drivers with fixed posts and at water depots, workmen and various employees of the company's mineral section.

c) Porters, store-keepers, gangmen, and pointsmen.

France.

5. *F. East.* — *a*), *b*), *c*) The company has been obliged to construct or acquire dwellings for the employees of its various departments in certain localities, either in the devastated zone or where the population is sparse.

6. *M. F.* — *a*) In 1913 a « cheap dwellings » society was formed under the auspices of the Midi Railway Company with the object of securing for the Company's employees dwellings which should be entirely hygienic in construction. This society is administered under the laws of the 12 April 1906, the 23 December 1912, and the 24 October 1919.

Employees of all branches of the service are eligible for these dwellings; preference is always given to those with the lowest remuneration and the greatest number of children dependent upon them.

7. *P. O.* — *a*), *b*), *c*) Yes, and in an increasing degree because of the present scarcity of houses. No distinction is made between the different grades of employees.

8. *P. L. M.* — *a*) District superintendents, foremen platelayers, platelayers.

b) Yes, locomotive office staff and running staff.

c) All classes of employees.

9. *F. St.* — *a*), *b*), *c*) In case were employees, other than those referred to in section A as being entitled to free lodging, are compelled to live in a lodging provided by the railway, a sum of 10 % is deducted from the total remuneration counting for pension.

Great Britain.

10. *G. & S. W.* — *a*), *b*), *c*) See answer to question 1 of section A.

11. *G. C.* — There is no undertaking on the part of the company to provide houses for their employees. Those houses which were originally built to accommodate the staff are divided between the :

a) Platelayers and signal fitters.

b) Drivers and firemen.

c) Stationmasters, signalmen, and porters.

12. *G. E.* — *b*) Lodging expenses are allowed to such employees as are sent away from their depot on duty.

c) Stationmasters, signalmen, guards, porters and police.

13. *G. W.* — *a*), *b*), *c*) Houses owned by the company at a number of places are let to employees irrespective of their grade or of the department to which they belong.

14. *L. Y.* — *a*) Drivers and firemen.

b) Guards.

15. *L. S. W.* — *b*) Workmen in locomotive and carriage shops at Eastleigh works.

c) Gate-keepers.

Italy.

17. *E. I.* — *a*), *b*), *c*) Yes, in several localities.

Preference given to employees whose wages are less tan 5 780 lire. This limit will have to be raised in view of increased wages. Preference is also given in cases of large families.

Luxemburg.

19. *P. H.* — *a*), *b*), *c*) Yes, for all classes of employees when accommodation available.

Norway.

20. *N. St.* — *a*), *b*), *c*) In certain cases the administration has found dwellings for the following grades of employees :

Permanent-way inspectors; stationmasters; line foremen; linemen; carriage examiners; office staff; firemen; pointsmen; storesmen; carriage markers.

Holland.

21. *D. St.* — *a*), *b*), *c*) Yes, when accommodation is required; all classes of employees are treated on equal terms.

Sweden.

24. *B.* — *a*), *b*), *c*) Only when dwellings are not otherwise available.

Switzerland.

25. *F. a*), *b*), *c*) Yes, for employees of all departments.

Algeria.

26. *A. E.* — *a*), *b*), *c*) The company has constructed 34 dwellings at Sidi-Bel-Abbes for employees of the line between Sidi-Bel-Abbes and Mercier-Lacombe.

Indian Empire.

28. *G. I.* — *a*), *b*), *c*) Yes, officials, workshop foremen, chargemen, workmen, inspectors, and clerical staff generally.

29. *M. S. M.* — *c*) Guards, brakesmen, station and office clerical staff, and ticket collectors.

30. *O. R.* — *a*), *b*), *c*) Yes.

South Africa.

31. *S. Afr.* — *a*), *b*), *c*) Yes, accommodation is found within the railway boundaries.

Australia.

32. *S. Aust.* — *a*), *b*), *c*) Where there is no town or village, tents or huts are provided for employees of the engineer's department.

QUESTION 2. — *With this object in view, has your company constructed or acquired suitable buildings?*

Belgium.

1. *E. B.* — Constructed and acquired.

Denmark.

3. *E. D.* — Yes.

Spain.

4. *N. E.* — Constructed and acquired.

France.

5. *F. East.* — Constructed and acquired.

6. *M. F.* — Constructed and acquired.

7. *P. O.* — Yes.

8. *P. L. M.* — Yes.

9. *F. St.* — Te administration has built dwellings.

Great Britain.

10. *G. & S. W.* — Yes.

11. *G. C.* — Constructed and acquired.

12. *G. E.* — Yes.

13. — *G. W.* — Yes.

14. *L. Y.* — Yes.

15. *L. S. W.* — Constructed and acquired.

Italy.

17. *E. I.* — Constructed and acquired.

Luxemburg.

19. *P. H.* — The company has built dwellings.

Norway.

20. *M. St.* — Constructed and acquired.

Holland.

21. *D. St.* — Constructed and acquired.

Sweden.

24. *B.* — Constructed and acquired.

Switzerland.

25. *F.* — Constructed and acquired.

Indian Empire.

28. *G. I.* — It is proposed to purchase or build houses.

30. *O. R.* — Yes.

South Africa.

31. *S. Afr.* — Such employees occupy the same types of buildings as those for whom accommodation requires to be found.

Australia.

32. *S. Aust.* — Constructed.

QUESTION 3. — *What is the number of this class of buildings possessed by your company 31 December 1920?*

Belgium.

1. *E. B.* — 122.

Denmark.

3. *E. D.* — About 900.

Spain.

4. *N. E.* — About 850.

France.

5. *F. East.* — 2 800 dwellings for families, and 1 000 rooms for unmarried men.

6. *M. F.* — 109 houses and two buildings divided up into 16 sets of apartments.

7. *P. O.* — 184 dwellings, comprising 322 sets of apartments.

8. *P. L. M.* — 641 dwellings.

9. *F. St.* — 89 houses.

Great Britain.

10. *G. & S. W.* — See answer to question 7 of section A.

11. *G. C.* — 597.

12. *G. E.* — 1814 both inside and outside the fence.

13. *G. W.* — 2 356.

14. *L. Y.* — 4 lodging houses accommodating respectively 57, 68, 73 and 86 men.

15. *L. S. W.* — 1 850 houses and cottages.

Italy.

17. *E. I.* — 4 677 dwellings.

Luxemburg.

19. *P. H.* — 34.

Norway.

20. *N. St.* — 248.

Holland.

21. *D. St.* — 1 665 dwellings, including 476 previously used as service dwellings, and 233 wooden movable dwellings.

Sweden.

24. *B.* — 514.

Switzerland.

25. *F.* — 932.

South Africa.

31. *S. Afr.* — 9 293 houses for the European staff.

Australia.

32. *S. Aust.* — 89 « barracks ».

QUESTION 4. — *How many of these dwellings are composed of one room and a kitchen? How many are there with two rooms and a kitchen? How many with three rooms and a kitchen, etc.?*

Belgium.

1. *E. B.* — The complete type of dwelling for employees contains, in addition to two cellars, three rooms on the ground floor and four rooms above.

The complete type of workmen's dwelling contains, in addition to a cellar, four rooms on the ground floor and three rooms above.

All contain at least three rooms and a kitchen.

Denmark.

3. *E. D.* — 1 room and a kitchen, none; 2 rooms and a kitchen, a few; 3 rooms and a kitchen, the majority; more than 3 rooms and a kitchen, about 100.

Spain.

4. *N. E.* — All these dwellings contain at least two rooms exclusive of the kitchen.

France.

5. *F. East.* — 1 room and a kitchen, 5 %; 2 rooms and a kitchen, 60 %; 3 rooms and a kitchen, 35 %.

The kitchen is generally larger than the other rooms, and serves as living room.

6. *M. F.* — Each house contains a general room used both as kitchen and dining room, three bedrooms, a lock-up out-house.

Ten dwellings consist of two rooms and a kitchen; six others consist of three rooms and a kitchen; each of these sixteen dwellings has a cellar and an attic.

7. *P. O.* — 1 room and kitchen, 52; 2 rooms and a kitchen, 194; 3 rooms and a kitchen, 45; 4 rooms and a kitchen, 14; 5 or more rooms and a kitchen, 17; total, 322.

8. *P. L. M.* — *Separate houses (Workmen's cities).* 461 *viz.* : 36 of 2 rooms each; 165 of 3 rooms each; 245 of 4 rooms each; 15 of 5 rooms each.

Appartment houses. Comprising 180 dwellings, viz. : 20 of 2 rooms each; 117 of 3 rooms each; 38 of 4 rooms each; 5 of 5 rooms each.

9. *F. St.* — 1 room and kitchen, 4; 2 rooms and kitchen, 97; 3 rooms and kitchen, 73; 4 rooms and kitchen, 46; 5 rooms and kitchen, 8.

Great Britain.

10. *G. & S. W.* — 1 room and a kitchen, 758; 2 rooms and a kitchen, 213; 3 or more rooms and a kitchen, 175.

11. *G. C.* — About one third of the houses contain two or three rooms and a kitchen; the others contain five or more rooms besides a kitchen.

12. *G. E.* — The accommodation provided consists mostly of cottages containing parlour, kitchen, scullery, and two or three bedrooms.

13. *G. W.* — 1 room and a kitchen, 14; 2 rooms and a kitchen, 286; 3 rooms and a kitchen, 420; 4 rooms and a kitchen, 889; 5 or more rooms and a kitchen, 747.

14. *L. Y.* — These lodging houses contain : large kitchen; clothes drying room with special stoves; mess and reading room; sanitary, lavatory and bathroom accommodation; sleeping cubicles.

15. *L. S. W.* — 1 room and a kitchen, 11; 2 rooms and a kitchen, 91; 3 rooms and a kitchen, 474; 4 or more rooms and a kitchen, 1 582, total, 2 158.

Italy.

17. *E. I.* — 1 room only, 126; 1 room and a kitchen, 1 486; 2 rooms and a kitchen, 1 856; 3 rooms and a kitchen, 1 019; 4 rooms and a kitchen, 162; 5 rooms and a kitchen, 23; 6 rooms and a kitchen, 5; total 4 677.

Luxemburg.

19. *P. H.* — 1 room and kitchen, and room with baking oven, 1; 4 rooms, kitchen and outhouse, 21; 4 rooms, kitchen and two attics, 5; 6 rooms, kitchen and two attics, 4; 7 rooms and kitchen, 3.

Norway.

20. *N. St.* — 1 room and kitchen, 62; 2 rooms and a kitchen, 126; 3 rooms and a kitchen, 43; 4 rooms and a kitchen, 10; 5 rooms and a kitchen, 5; 6 rooms and a kitchen, 2.

Sweden.

24. *B.* — 1 room, 7; 1 room and a kitchen, 338; 2 rooms and a kitchen, 92; 3 rooms and a kitchen, 39; 4 rooms and a kitchen, 25; 5 rooms and a kitchen, 9; 6 rooms and a kitchen, 4.

Switzerland.

25. *F.* — 1 room and a kitchen, 20; 2 rooms and a kitchen, 101; 3 rooms and a kitchen, 317; 4 rooms and a kitchen, 316; 5 rooms and a kitchen, 258; more than 5 rooms and a kitchen, 121.

Algeria.

26. *A. E.* — *Locomotive, carriage and wagon departments :* 9 dwellings for married employees; 2 dwellings for unmarried employees.

Traffic department : 21 dwellings for married employees; 2 dwellings for unmarried employees.

Dwellings for married employees contain three rooms, one of which serves as kitchen.

Dwellings for unmarried employees have only one room.

South Africa.

31. *S. Afr.* — 1 room and a kitchen, 275; 2 rooms and a kitchen, 2 252; 3 rooms and a kitchen, 2 488; 4 rooms and a kitchen, 3 387; 5 rooms and a kitchen, 589; 6 rooms and a kitchen, 208; 7 rooms and a kitchen, 52; over 7 rooms and a kitchen, 42.

Australia.

32. *S. Aust.* — These buidings usually consist of a kitchen, dining room, and bedrooms, the number of rooms depending on requirements.

QUESTION 5. — *What is the approximate cost per dwelling?*

Belgium.

1. *E. B.* — 4 000 fr.

Denmark.

3. *E. D.* — Before the war about 1 000 crowns per room. At the present time about 3 500 crowns.

Spain.

4. *N. E.* — About 3 600 pesetas at the date of construction; this figure is now more than doubled.

France.

5. *F. East.* — 1 800 fr. before the war. 5 500 fr. at the present day.

6. *M. F.* — At Bordeaux, 7 400; at Tarbes, 6 500; at Toulouse, 6 350; at Villefranche, 2 600.

7. *P. O.* — The average net cost of a dwelling consisting of four rooms which was 6 000 fr. before the war is now 25 000 fr.

Great Britain.

10. *G. & S. W.* — £165.

11. *G. C.* — About £285, inclusive of land, road-making, etc.

12. *G. E.* — The average cost of a cottage before the war was £250, and of a station-master's house £500. The cost of a cottage to-day would be approximately £1 000.

13. *G. W.* — Pre-war cost £231 to £573 according to type of house. Present day cost £1 005 to £1 550.

14. *L. Y.* — £96 per employee.

15. *L. S. W.* — The company's standard cot-

tage (4 rooms, kitchen and scullery) cost approximately £300 before the war, exclusive of land. Cottages erected since the war have cost from £1 000 to £1 200 each.

Italy.

17. *E. I.* — Before the war 2 000 lire. Present day, from 10 000 to 15 000 lire according to locality.

Holland.

21. *D. St.* — Impossible to state.

Switzerland.

25. *F.* — Not known.

Algeria.

26. *A. E.* — Net cost of three-roomed dwelling 11 925 fr.; of a one-roomed dwelling 3 975 fr.

South Africa.

31. *S. Afr.* — The type P. 53 building is the one that is being built to-day, and its present cost is from £1 200 to £1 500 according to locality. Prior to the war the average cost of a house of type P. 3, then generally used, was £600.

Australia.

32. *S. Aust.* — Those built in 1880 cost about £70 per room; those built in 1920, £200.

QUESTION 6. — *What amount of capital was invested in these dwellings at the 31 December 1920?*

Belgium.

1. *E. B.* — 2 500 000 fr.

Denmark.

3. *E. D.* — About 5 000 000 crowns.

France.

5. *F. East.* — 35 millions fr. 30 millions having been so invested since the war.

6. *M. F.* — 795 500 fr.

7. *P. O.* — 5 000 000 fr.

8. *P. L. M.* — 22 220 000 fr.

Great Britain.

10. *G. & S. W.* — £187 396.

12. *G. E.* — £518 560.

14. *L. Y.* — £27 508.

15. *L. S. W.* — Approximately £796 000.

Italy.

17. *E. I.* — 84 500 000 lire.

Holland.

21. *D. St.* — Unknown.

Sweden.

24. *B.* — 3 950 000 kronen.

Switzerland.

25. *F.* — Not known.

South Africa.

31. *S. Afr.* — £4 580 000 for all the dwellings in the Union of South Africa.

QUESTION 7. — *Has your company studied different types of dwellings, or important groups of dwellings for the staff?*

Belgium.

1. *E. B.* — Yes.

Denmark.

3. *E. D.* — Yes.

Spain.

4. *N. E.* — The only scheme for a group of dwellings is that in connection with the auxiliary station at Las Matas.

France.

5. *F. East.* — Yes.

6. *M. E.* — Yes.

7. *P. O.* — Yes.

8. *P. L. M.* — Yes.

9. *F. St.* — Yes.

Great Britain.

10. *G. & S. W.* — Yes.

11. *G. C.* — Yes.

12. *G. E.* — No.

13. *G. W.* — The types adopted before the war have been abandoned in view of present day costs.

14. *L. Y.* — No.

15. *L. S. W.* — Group of cottages at Eastleigh.

Italy.

17. *E. I.* — Yes.

Holland.

21. *D. H.* — No.

Sweden.

24. *B.* — Yes.

Switzerland.

25. *F.* — No.

Algeria.

26. *A. E.* — Yes.

Indian Empire.

29. *M. S. M.* — Yes.

30. *O. R.* — There are approved types for each class of employee, but these types are designed to suit conditions peculiar to India.

South Africa.

31. *S. Afr.* — Several types of dwellings have been designed.

Australia.

32. *S. Aust.* — No.

QUESTION 8. — *Have these dwellings gardens?*

Belgium.

1. *E. B.* — Yes, generally from 350 to 400 m².

Denmark.

3. *E. D.* — Yes, ordinarily.

Spain.

4. *N. E.* — Yes, generally.

France.

5. *F. East.* — Yes.

6. *M. F.* — Yes.

7. *P. O.* — Yes, from 200 to 300 m².

8. *P. L. M.* — Yes.

9. *F. St.* — Yes.

Great Britain.

10. *G. & S. W.* — Yes, the majority.

11. *G. C.* — Yes, the majority.

12. *G. E.* — Yes, about 500 m² (1/8 of an acre).

13. *G. W.* — Yes, usually.

14. *L. Y.* — Yes.

15. *L. S. W.* — The company's usual allowance per cottage is 10 rods of garden ground where available.

Italy.

17. *E. I.* — Only in certain cases where ground has been procurable at reasonable rates.

Norway.

20. *N. St.* — Some houses have gardens, others not.

Holland.

21. *D. St.* — The majority of the houses have gardens.

Sweden.

24. *B.* — Yes.

Algeria.

26. *A. E.* — Yes.

Indian Empire.

29. *M. S. M.* — No.

30. *O. R.* — Only the houses of higher classes of employees.

South Africa.

31. *S. Afr.* — There is usually sufficient space for garden purposes.

Australia.

32. *S. Aust.* — Only those made by the tenants.

QUESTION 9. — *If your company has established important groups of dwellings, has it*

also added schools, and shops for the supply of food?

Belgium.

1. *E. B.* — No.

Denmark.

3. *E. D.* — No.

Spain.

4. *N. E.* — Yes.

France.

5. *F. East.* — No, but in certain devastated areas hutments have been provided for use as schools or retail shops.

6. *M. F.* — No.

7. *P. O.* — No.

8. *P. L. M.* — Yes.

9. *F. St.* — No.

Great Britain.

10. *G. & S. W.* — Yes.

11. *G. C.* — The company have not established important groups of dwellings.

12. *G. E.* — No.

13. *G. W.* — No.

14. *L. Y.* — No.

15. *L. S. W.* — No.

Italy.

17. *E. I.* — At Rome, Mestre, Naples, Milan and Turin provision shops have been provided. At Rome and Florence recreation grounds have been provided for the children.

Norway.

20. *N. St.* — No important groups of dwellings have been built.

Holland.

21. *D. St.* — No.

Sweden.

24. *B.* — No.

Switzerland.

25. *F.* — No.

Algeria.

26. *A. E.* — No.

Indian Empire.

29. *M. S. M.* — Schools have been provided at centres, and branch co-operative stores at stations where there are a large number of staff quarters.

30. *O. R.* — We have a small number of schools but no shops.

South Africa.

31. *S. Afr.* — No.

Australia.

32. *S. Aust.* — No.

QUESTION 10. — *What funds are utilised by your company for acquiring or constructing these dwellings?*
Is it advisable to use the funds of provident societies?

Belgium.

1. *E. B.* — Its own funds.

Denmark.

3. *E. D.* — The ordinary allocation of funds voted by the Rigsdag. In the last few financial years the allocation has been 1 000 000 crowns per annum.

Spain.

4. *N. E.* — No special funds are reserved for this class of construction.

France.

5. *F. East.* — Borrowed funds. No, the income from rents is too small.

6. *M. F.* — The Society's capital (1 000 000 fr.) has been provided for the most part out of the Pensions Fund; the remainder has been subscribed by the directors and higher officials of the company. This use of the funds of provident societies is legitimate, provided the return on the money is sufficient to ensure the proper working of such societies.

7. *P. O.* — The cost of acquiring or constructing these houses is generally charged to

the company's account (supplementary works). These houses are therefore part of the company's property.

8. *P. L. M.* — Company's capital.

9. *F. St.* — 22 buildings have been built at Thouars as an experiment out of money borrowed from the railway's Pension Fund.

The Pensions Fund being an autonomous institution, the State Railways have to guarantee it a yearly interest on the capital invested in these houses equal to the average receipts from other capital of the Fund invested in property. The guarantee thus given is not without disadvantages from the accountancy point of view. The railway has therefore decided to discontinue the use of such funds as regards future constructions. This expenditure will be a charge on the construction account of new lines, or on the account relative to works supplementary to first establishment, and the rents payable will be included in the receipts of the working account which bears the charges on capital thus invested.

Great Britain.

10. *G. & S. W.* — The company's capital.

12. *G. E.* — The whole of the funds for building cottages are provided by the company.

14. *L. Y.* — Capital account.

15. *L. S. W.* — The capital of the company, and a special fund established for this purpose.

Italy.

17. *E. I.* — Provident society funds.

Norway.

20. *N. St.* — Funds are voted in the annual budget.

Holland.

21. *D. St.* — The cost of dwellings is a charge on the capital account. We do not advise the use of reserve funds for this purpose.

Sweden.

24. *B.* — The administration advances the necessary funds in each individual case for the purchase or construction of these houses.

Switzerland.

25. *F.* — The money for new constructions or alterations is provided from the administration's available funds. In only one case has use been made of money from the Pensions Fund for building dwellings. In this case it was applied for by employees at Basle station. Apart from this case, the use of Provident Society funds for such purposes has been avoided so as not to occasion criticism on the part of the employees, who sometimes regard these institutions as their particular property.

Algeria.

26. *A. E.* — The funds are supplied by the colony.

Indian Empire.

28. *G. I.* — Funds of provident societies cannot be used for building purposes. The government is always prepared to consider applications for funds required for the construction of dwellings.

29. *M. S. M.* — Funds are provided by the government of India.

30. *O. R.* — Capital account.

South Africa.

31. *S. Afr.* — Loan funds.

Australia.

32. *S. Aust.* — Funds are voted by Parliament.

QUESTION 11. — *What is the rate of interest on the capital invested?*
What basis is used to settle the amount of rent paid by the staff?

Belgium.

1. *E. B.* — *a*) About, 4 %.

Denmark.

3. *E. D.* — *b*) Cost of construction, and remuneration of the employees.

Spain.

4. *N. E.* — *a*) The total of rents received is included in the general receipts of the company.

France.

5. *F. East.* — *a*) 2 to 3 % of the present net cost.

b) Rents are fixed according to the number of rooms occupied, including the kitchen.

6. *M. F.* — *a*) 2.84 % for the financial year 1919.

b) The figures established by the « Commission paritaire », and the lodging allowances granted to employees, it is less than these figures and allowances.

7. *P. O.* — *a*) 3 %.

b) The rents of similar houses in the locality.

8. *P. L. M.* — *b*) We take the average rent paid in the locality for houses of similar size and increase this by 50 % to cover the additional comfort afforded to our employees in the « Workmen's Cities ».

9. *F. St.* — *b*) The rents payable in the locality. Our rents are always slightly lower.

Great Britain.

10. *G. & S. W.* — *a*) Before the war 2 1/2 %.

b) The average pre-war rent for a two-apartment house was £5, for a three-apartment house £6.10.0. These rents are increased by 40 % under the terms of the recent rent act.

11. *G. C.* — *a*) 3 1/2 %.

12. *G. E.* — *a*) Over the whole system the return on the capital outlay is less than 2.5 %.

b) 2 1/2 % on capital outlay.

13. *G. W.* — *b*) Rents are based on rents of similar houses in the locality.

14. *L. Y.* — *a*) On pre-war houses referred to in question 7, the interest on capital obtained as rent is 5 %.

b) The rents originally fixed for employees were 25 % less than the actual letting value, but these rents are now being raised as authorised by recent legislation.

15. *L. S. W.* — *a*) The net return on cottages does not exceed 2 %.

b) The standard rent for a three-bedroom cottage was originally fixed at 3 s. 9 d. a week; for a cottage containing not more than two bedrooms 3 s. a week; these figure have now been increased under the increase of rents acts.

Italy.

17. *E. I.* — *a*) 3.75 %.

b) The rent is fixed at 5 1/2 % on the capital outlay, and is calculated as follows : Interest on capital, 3.75; cost of maintenance, 0.50; caretaking, light, water, etc., 0.40; management charges, 0.10; taxes, 0.75; total, 5.50.

Norway.

20. *N. St.* — *a*) Varying from 2 to 4 or 5 %.

b) The rent is generally less than the normal rent in the district.

Holland.

21. *D. St.* — *a*) Impossible to define.

b) The basis is the value of the dwelling; the rent does not exceed 15 % of the tenant's wages or 8 % of the purchase price.

Sweden.

24. *B.* — *a*) 3 %.

Switzerland.

25. *F.* — *a*) About 4 %.

b) Rents are based on the minimum rents payable in the locality.

Algeria.

26. *A. E.* — *a*) 6 %.

Indian Empire.

28. *G. I.* — *a*) Between 4 and 6 1/2 %.

b) The rent does not exceed 10 % of the remuneration.

29. *M. S. M.* — *a*) Rent varies from 5 % to 7 1/2 % on the capital cost of a bungalow. Subordinate staff do not pay more than 10 % of their salary for rent except in special cases.

30. *O. R.* — *a*) 4 1/2 %.

b) The rent does not exceed 10 % of remuneration.

South Africa.

31. *S. Afr.* — *a*) On these funds the administration pays from 3 % to 5 %.

b) The aim of the administration is to obtain an average gross return of 6 1/2 % on outlay, including interest, depreciation, sanitary and other charges.

Australia.

32. *S. Aust.* — *a*) Formerly the interest was about 3 %; it now varies from 4 to 6 %.

b) There are three classes of houses, the rent for which is respectively 9 d., 1 s. and 1 s. 6 d. per room.

QUESTION 12. — *Have you made arrangements to adjust the rents of dwellings of recent construction which cost much more than those built before the war?*

Belgium.

1. *E. B.* — The rent should be fixed at 6 % of the capital invested. It has been reduced to 4 % of the cost of construction or of the purchase price.

Denmark.

3. *E. D.* — Yes, the maximum rent is fixed at 1/8 of the average remuneration.

Spain.

4. *N. E.* — There are no dwellings of recent construction.

France.

5. *F. East.* — The administration contents itself with a reduced return, the deficiency in interest on the capital invested being a charge on working expenses.

6. *M. F.* — This question is at present under consideration, and no decision has yet been arrived at.

7. *P. O.* — Yes, by adopting a lower rate of interest; by the adoption of the most economic types; and by the use of mixed concrete and slag as building material.

9. *F. St.* — We have raised slightly the rents of workmen's houses built before the war, in order to counterbalance to a certain degree the considerable loss resulting from the fact that it is impossible, in respect of new constructions to require a rent equal to a normal interest on capital invested.

Great Britain.

10. *G. & S. W.* — No houses have been erected for workmen since 1914.

11. *G. C.* — Adjustement of rents is regulated by the increase of rent and mortgage interest (Restrictions) Act 1920.

12. *G. E.* — No. Cottages are being built at the present time.

13. *G. W.* — No new houses have been constructed.

14. *L. Y.* — No.

15. *L. S. W.* — Cottages erected since the war are rented at a higher figure, though not on the full « economic basis' ».

Italy.

17. *E. I.* — Yes. In the case of the new houses the administration pays 2 1/2 % of the capital outlay and the State 1/4 %, so that the rent works out at 2 3/4 % on the cost of construction.

It is also the intention to increase the rents of pre-war houses so as to diminish proportionately the rents of houses built during and since the war.

Norway.

20. *N. St.* — In general, rents of new houses are the same as those for the older houses.

Holland.

21. *D. St.* — The law regarding rents forbids the raising of rents.

Sweden.

24. *B.* — No.

Algeria.

26. *A. E.* — The question is under consideration.

Indian Empire.

28. *G. I.* — No.

30. *O. R.* — They adjust themselves by the increased capital cost.

South Africa.

31. *S. Afr.* — No.

Australia.

32. *S. Aust.* — Yes, a proposal is now under consideration to double rents.

QUESTION 13. — *What are the advantages enjoyed by the staff occupying these dwellings? What is the reduction in rent, expressed in so much per cent, in comparison to a private house of similar construction?*

Belgium.

1. *E. B.* — *a*) Being housed in hygienic dwellings near to place of work.
b) Variable.

Denmark.

3. *E. D.* — *a*) Freedom from the present-day difficulty of finding a house. Lower rent.
b) On the average 33 %.

Spain.

4. *N. E.* — *a*) Living near to place of work, and greater comfort.
b) 60 to 80 %.

France.

5. *F. East.* — *a*) Being able to find accommodation.
b) Impossible to state.

6. *M. F.* — *a*) Living in healthy and well arranged dwellings; and the saving made possible by the low rent paid.
b) 50 %.

7. *P. O.* — *a*) The employee is lodged near his work; he pays a lower rent, and generally he has a garden. The hygienic conditions are better.
b) 15 to 20 %.

8. *P. L. M.* — *a*) Nearness to place of work, and greater comfort.

9. *F. St.* — *a*) The possession of a hygienic dwelling of modern construction near to the place of work, and at a reasonable cost.
b) Impossible to state.

Great Britain.

10. *G. & S. W.* — *a*) Generally smaller rents, and the convenience of living near to their work.
b) On an average 20 %.

11. *G. C.* — *b*) Reduction practically confined to stationmasters. No reduction in other cases.

12. *G. E.* — Better class accommodation nearness to work, and a saving in rent.

13. *G. W.* — *a*) The houses are kept in repair by the company, and in the case of supervisory grades the rent and rates together may not exceed 15 % of salary.
b) See answer to question 11.

14. *L. Y.* — *a*), *b*) See answer to question 11.

15. *L. S. W.* — *a*) Rents below actual letting value; garden allotments free; special passes for marketing at nearest market town; better maintenance.
b) About 20 %.

Italy.

17. *E. I.* — *a*) Cheap hygienic dwellings near to place of work.
b) About 40 %.

Luxemburg.

19. *P. H.* — *a*) Lower rent.
b) About 65 %.

Luxemburg.

20. *N. St.* — *a*) Low rent, good accommodation near to place of work.
b) About 30 to 50 %.

Norway.

21. *D. St.* — *a*) Possibility of being lodged. Moderate rents; security of tenure.
b) Rents are not less than those of non-company houses.

Sweden.

24. *B.* — *a*) Lower rent.

Switzerland.

25. *F.* — *a*) Moderate rent, and residence near to place of work.
b) In the country the rents of railway houses may be higher than rents paid in the locality, but in towns they are certainly lower than rents of private houses.

Algeria.

26. *A. E.* — *a*) Living near to place of work.
b) Not known.

Indian Empire.

28. *G. I.* — *a*) Moderate rent, and hygienic quarters.

29. *M. S. M.* — *a*) Dwellings kept in good repair; no difficulty in securing lodgings on transfer from one station to another.

b) In Madras the reduction would be about 50 %.

30. *O. R.* — *a*) Hygienic dwellings in good locality.

b) At least 33 %.

South Africa.

31. *S. Afr.* — *a*) Low rental, and easier facility for getting to and from work.

b) About 40 % in the large towns.

Australia.

32. *S. Aust.* — *a*) Low rent, permanancy of tenancy.

b) 50 %.

QUESTION 14. — *What programme do you expect to follow in the future?*
Please explain the arrangements made by your company for the management of these dwellings?

Belgium.

1. *E. B.* — In view of the scarcity of houses, and in certain cases the difficulty of obtaining employees because of no houses being available, the question of the creation of « Garden-Cities » appears worthy of consideration.

Where possible an area of 400 m² will be allotted to each dwelling.

It is estimated that an economic dwelling will cost 14 000 fr. The rent will be fixed on a basis of 4 % of the cost of construction, and will therefore be 560 fr. per annum.

Denmark.

3. *E D.* — For the financial year 1 April 1921, to 31 March 1922, to continue the programme so far followed.

The management of the dwellings is in the hands of the railway administration.

Spain.

4. *N. E.* — We do not expect to continue the building of dwellings of this class except in the Asturias, and at auxiliary stations in the heart of the country.

Greece.

5. *F. East.* — To assist the « cheap houses » societies as soon as they are in a position to recommence their normal activities. The company itself undertakes the management.

6. *M. F.* — The society is contemplating the construction or acquisition of new houses.

A director of the society undertakes the general management, local management is in the hands of employees of the Midi Company.

7. *P. O.* — To limit as far as possible the purchase or construction of this class of houses, and to take an increasing share in construction and acquisition of dwellings by the employees themselves under the conditions indicated in section C. Houses forming part of the company's property are managed as such by the company.

8. *P. L. M.* — No programme has been laid down in advance. The houses are under the management of the line service.

9. *F. St.* — It is not at present possible to draw up a programme.

Great Britain.

10. *G. & S. W.* — Under present circumstances it is not intended to provide more houses.

The company itself manages these dwellings together with the other land and property owned by the company.

11. *G. C.* — The company do not contemplate the building of additional dwellings.

The company's Estate department undertakes the management and maintenance of the property.

12. *G. E.* — Building will only be done in special cases. The administration and management of the property is in the hands of the surveyor to the company.

13. *G. W.* — No definite programme has been laid down.

The management of the dwellings is in the hands of the company's estate agent.

15. *L. S. W.* — The company have established a fund for meeting cost of building cottages where required.

The Company's Estate Department manages the houses.

Italy.

17. *E. I.* — As the staff greatly appreciate these houses it is the intention to provide more of them so far as means allow.

The administration has the entire management of these houses.

Luxemburg.

19. *P. H.* — The maintenance of the company's dwellings is in the hands of the engineer's department.

Norway.

20. *N. St.* — If the need arises application will be made for grants for construction of dwellings, as has been the practice hitherto.

The administration undertakes the management of these houses.

Holland.

21. *D. St.* — The company's efforts in this direction will certainly tend to diminish as conditions become more normal.

Switzerland.

25. *F.* — No, supervision and maintenance is in the hands of the permanent-way inspectors.

Algeria.

26. *A. E.* — If the housing difficulty continues, to build dwellings for certain classes of employees.

Indian Empire.

29. *M. S. M.* — To build dwellings for employees who have difficulty in finding lodgings in towns or neighbouring villages.

Maintenance is in the company's hands.

30. *O. R.* — A certain amount of capital is set apart yearly, as available, for the construction of dwellings.

The buildings are constructed and maintained by the engineer's department.

South Africa.

31. *S. Afr.* — The policy is gradually to build houses for as many of the staff as possible, *i.e.*, those who in the Administration should be accommodated in this way.

The management is conducted by the Administration's officers.

Australia.

32. *S. Aust.* — A small number of additional houses will be built each year.

The dwellings are under the control of the engineer's department, and are inspected quarterly by the district forman or inspector.

QUESTION 15. — *Do you consider that running special trains for the conveyance of the staff between their quarters and their work more economical and satisfactory than the providing of dwellings near their work?*

Is the use of these trains gratuitous to the staff, or is some rate fixed?

In the latter case, on what basis are the fares arranged?

Belgium.

1. *E. B.* — Railway employees obtain a reduction of 50 % on the ordinary workman's fares.

Denmark.

3. *E. D.* — No.

Spain.

4. *N. E.* — In view of the present cost of building it is evidently more economic to run special trains to convey employees when there are a considerable number to be taken to any given spot. Fares are not charged to employees for the use of these trains.

France.

5. *F. East.* — Yes, when the number of workmen to be conveyed is sufficient to justify the running of a special train. Fares are not charged to employees for the use of these trains.

6. *M. F.* — It would appear preferable to construct or acquire houses rather than oblige employees to travel to work by train.

All employees are allowed free travelling on the company's lines.

7. *P. O.* — The solution depends essentially on local conditions. On the outskirts of large centres there are workmen's trains for conveying those employees who are permitted to live at a distance, or again carriages are reserved for them in passenger trains, or they use such trains as ordinary passengers. Such conveyance is always free.

8. *P. L. M.* — The questions has rarely arisen. No general principles adopted. Conveyance is free.

9. *F. St.* — Only in particular cases. The railway prefers to build workmen's houses; the running of special trains would be no solution of the housing difficulty.

In all cases employees travel free over the whole system, and no fare would be charged for travelling by trains already running, or which might be run specially.

Great Britain.

10. *G. & S. W.* — It is more economical and satisfactory to provide dwellings for the workmen near to their work.

The use of these trains is free to the staff.

11. *G. C.* — There is no such case under this company.

12. *G. E.* — Employees are conveyed free between their homes and their work.

In the case of the locomotive department at Stratford, two trains, one out and one back, are run during the dinner-hour. Employees pay a privilege fare quarter-rate for the use of these trains.

13. *G. W.* — Fares are charged according to distance, season tickets being issued at reduced rates.

14. *L. Y.* — Such trains are not necessary on the company's system.

15. *L. S. W.* — Workmen's trains are run at cheap fares to enable staff employed in locomotive, carriage and wagon departments to live away from work in districts where houses are available. The arrangement is considered preferable to providing dwellings near to place of work.

Italy.

17. *E. I.* — It appears preferable to build houses near to the place of work.

In a very few cases, as for example at Milan and Naples, the administration finds it necessary to run special workmen's trains, travelling by which is free.

Norway.

20. *N. St.* — Employees use the ordinary trains free of charge.

Holland.

21. *D. St.* — We have no such special trains.

Sweden.

24. *B.* — No.

Switzerland.

25. *F.* — Wherever it is possible for employees to find lodgings at a moderate rent in the neighbourhood of large towns, trains are run at suitable times for use both by the public and by railway employees. The latter pay one-fifth of the ordinary season-ticket fare, which itself is extremely moderate.

By this means the railway has been able to avoid building lodginghouses for its employees.

Algeria.

26. *A. E.* — Special trains are run daily for conveying employees to the Sidi-Mabrouck workshops, particularly workmen living in the town of Constantine. The use of these trains is free to workmen.

Indian Empire.

28. *G. I.* — Trains are provided for locomotive carriage and wagon shops staff, who are allowed free passes.

29. *M. S. M.* — By running suburban trains congestion in towns can be avoided, but if a suitable site is available near the works it is better to build quarters. The workmen of the locomotive and carriage shops at Perambur are given free passes.

Clerks are given concession rates at 1/2 or 1/4 the public rate.

30. *O. R.* — We have only one train for the conveyance of employees to some shops which are at a distance from Lucknow.

No charges are made.

South Africa.

31. *S. Afr.* — Special trains are run free of charge for employees at Salt River; this is considered more economical and satisfactory than providing quarters adjacent to the works.

At other places employees are granted a reduction of 50 % on the rate chargeable to the public.

Australia.

32. *S. Aust.* — No, such a practice would not suit the long distance lines with the varying temperatures prevailing in this state.

CHAPTER C.

Co-operation of the company in the construction of dwellings built by the employees themselves.

QUESTION 1. — *What effects has the war had on the plans for the development of construction of dwellings and on rents in the most important centres?*

Belgium.

1. *E. B.* — The development of private building was arrested as a result of the war.

As regards rent, two successive laws fixed the permissible increases at 30 % in the first place, and then at 50 % above 1914 rents.

Denmark.

3. *E. D.* — The construction of dwellings since the war has not been sufficient to satisfy requirements.

The increase of rents of pre-war houses has been somewhat strictly limited by legislation. The cost of construction has increased by about 250 %.

Spain.

4. *N. E.* — The cost of construction may be taken as from 2 1/2 to 3 times higher than in 1914.

In June 1920 the State passed the necessary enactments for establishing rents at a level slightly different from that of 1914.

France.

5. *F. East.* — Since the war the employees' or other societies have not yet recommenced building.

6. *M. F.* — The result of the war has been to arrest everywhere the development of construction and to increase rents to a considerable degree.

7. *P. O.* — The construction of dwelling-houses was stopped by the war, it is only being resumed very slowly.

The present scarcity of houses and the general increase in the cost of living have caused an increase of rents.

The application of moratorium Acts has, however, so far kept the majority of rents at pre-war figures.

When these Acts are not applicable the increase of rent is much less proportionately than the general increase in the cost of living, and does not as a rule exceed 100 % in the more important centres.

8. *P. L. M.* — The cessation of building during the war; very slow resumption since the war. Scarcity of available dwellings, and considerable increases of rent for available dwellings.

9. *F. St.* — The scarcity of dwellings has had the effect of completely unsettling rents and the possibilities of finding lodging. The administration has not intervened in the con-

struction of houses for their own use by employees themselves.

Great Britain.

10. *G. & S. W.* — The rent restrictions Acts have hindered the development of construction.

12. *G. E.* — The cost of building cottages is so high since the war that for the time being the company has suspended the construction of cottages for the staff.

Italy.

17. *E. I.* — During the war the raising of rents was prohibited by legislation. Since the war certain gradual increases have been allowed.

Norway.

20. *N. St.* — The rents of houses recently built are high, while those of houses of less recent construction have not greatly increased. This is due largely to the official action of the « Rent Commission ».

Holland.

21. *D. St.* — Building has been rendered very difficult by the war, particularly because rents could not be raised above the level fixed by the « Rents Commission ».

Sweden.

23. *E. S.* — There has been a considerable increase in prices, a decrease of construction, and a scarcity of houses to let.

Switzerland.

25. *F.* — Almost complete cessation of building; great scarcity of dwellings, and considerable increase of rents.

Indian Empire.

30. *O. R.* — The war has enormously increased rents.

QUESTION 2. — *Have laws been promulgated in your country to encourage, especially during and after the war, the initiative of the staffs belonging to public bodies in general, and railway companies in particular, and supply subsidies for the construction of their own dwellings?*

In this case, on what basis are these laws formulated, and what results have been obtained as far as the staffs of railway companies are concerned?

Belgium.

1. *E. B.* — No.

Denmark.

3. *E. D.* — In certain circumstances the State and the communes grant facilities (land available on favourable terms, loans, exemption from taxes), for the construction of dwellings.

Spain.

4. *N. E.* — In Spain the law of the 12 June 1911, and the order of the 11 April 1912, were designed to encourage the construction of economic houses.

France.

5. *E. East.* — General legislation relating to cheap houses. Nothing relating specially to railways.

6. *M. F.* — The question of the formation of a building loan society, the operations of which shall be confined to constructions undertaken by employees of the company, is at present under consideration.

7. *P. O.* — Railway employees can share in the advantages conferred by the laws concerning cheap houses and small properties, by forming cheap-houses societies, or building loan societies.

The law of 12 April 1906, and of 10 April 1908 (called the « Ribot Law ») have been modified and completed by the laws of the 23 December 1912, and 24 October 1919, and by the Finance Act of the 31 July 1920.

The latter laws, by increasing the letting value of the so-called « cheap houses », and by placing large resources at the disposal of the societies, will enable the latter to continue and extend their operations, which had been checked by the war.

8. *P. L. M.* — There exists in France very extensive legislation concerning so-called « cheap » dwellings for families (see above).

9. *F. St.* — There is no legislation directly touching the initiative of employees of public bodies as regards workmen's houses, but there is general legislation regarding dwellings of this class.

An act of the 24 October 1919, authorised the « Caisse des Dépôts et Consignations » to allot up to 300 million fr. in loans to public authorities and cheap-houses societies out of the reserve and guarantee funds of the savings banks.

These loans are granted at a rate of 2 % per annum if the money is employed in facilitating the purchase or construction of individual cheap-houses or the acquisition of small properties; they are granted at a rate of 2 1/2 % if the money is employed in the purchase or construction of cheap-houses, or in the acquisition of small properties for letting only. A recent act, dated the 26 February 1921, lays down that the amount of the loans may not exceed 60 % of the net cost of purchase or construction of the property; and this proportion is increased to 75 % when the repayment of the loans is guaranteed by a « department » or commune; the period of repayment must not exceed 40 years.

The rules for the administration of this act have not yet been published; a « cheap-houses » society formed by employees of the State Railways at Le Mans proposes to make application for the act to be put into operation.

Great Britain.

10. *G. & S. W.* — The government passed the « Housing (Additional Powers) Act » 1919 which provides for grants to any persons or bodies of persons who comply with the conditions prescribed by the Scottish Board of Health.

The result has been nil so far as the staff of this Company is concerned.

12. *G. E.* — Recent legislation has thrown the onus of providing workmen's cottages upon the local authorities, a charge being made upon the rates and a subsidy being granted from the Treasury to meet the deficit between the economic rent and the rent charged to the tenant.

Italy.

17. *E. I.* — During the war no law was passed to encourage the building of dwellings. Since the war, by virtue of the Royal Order of the 27 November 1919 and the laws of the 5 October 1920 and 7 April 1921, the administration has been able to grant loans to the total amount of about 275 millions to co-operative societies formed by the staff for the construction of economic houses.

On this capital the co-operative societies have to pay interest at from 3 3/4 to 4 %, but in view of the very high cost of construction the State has decided to restrict within somewhat narrow limits the annual amount of interest to be paid by the staff, and gives an annual contribution of from 2 1/2 to 2 3/4 % of the capital invested.

Further, these co-operative societies have the privilege of being able to convey material at reduced rates and of obtaining supplies of material from the Administration on favourable terms.

Norway.

20. *N. St.* — State employees have been officially encouraged to make efforts to build their own dwellings.

The encouragement takes the form of *advances against wages* at low interest. On the State Railways such loans are granted up to 90 % of the cost of construction. In addition, sums have been allocated as advances of capital, *i. e.*, sums involving neither repayment nor interest, which employees receive towards the cost of construction, so that as far as possible they may be charged a rent in proportion to their financial circumstances. These sums have amounted to 40 % of the cost of construction, and do not as a rule exceed 12 000 kr.

Holland.

21. *D. St.* — The law regarding the 1901 dwellings has made possible the formation of societies subsidised by the State, and concerning themselves exclusively with the housing of the working classes. In certain towns where there are a considerable number of railway employees these societies have been formed by these employees. The procedure under

the law is as follows : The State makes loans for the construction of these dwellings, subject to payment of a moderate rate of interest. These grants must be repaid by yearly instalments within a period of 50 years.

As far as possible the rent is fixed in relation to the income of the tenant. If the rent is less than the annual cost of upkeep, the State contributes 75 % of the deficiency as an emergency subsidy and the commune bears the remaining 25 %.

Sweden.

23. *E. S.* — As regards the State Railway employees, the government in 1920 accorded to the administration of the State Railways the right to grant to permanent employees plots of land for the building of their own houses at one place only, *viz.*, Notviken Station, and to grand loans for the construction of these houses.

Switzerland.

25. *F.* — In view of the shortage of houses the Federal Council was compelled to issue an order making certain modifications in the legislation concerning rents, and authorising the communes to institute emergency tribunals for the purpose of settling differences between landlords and tenants in accordance with the provision of the order, further, the Confederation the cantons, and the communes have made subsidies out of sinking funds for the construction of dwelling houses, which are available for railway employees on the same terms as for others.

There are thus no special provisions favouring the personnel of the transport services.

Indian Empire.

30. *O. R.* — There is no special legislation on this question.

QUESTION 3. — *What sums have your company at their disposal to help in the construction of these houses?*

Denmark.

3. *E. D.* — The railways have no funds out of which to aid the construction of such dwellings.

Spain.

4. *N. E.* — No group of employees has claimed the benefits available under this law, and the company has therefore allotted no sum for the construction of houses.

France.

5. *F. East.* — No sums specially allotted for this purpose. Advances are made to employees on salary.

7. *P. O.* — Before the formation of the building loan societies, the advantages accruing from which are exclusively reserved to its employees, the Orleans Company had, by means of loans or subsidies, encouraged various societies concerned in the construction of workmen's houses. In view of the assistance afforded to them by the company these societies have given preferential treatment to the company's employees in the allotment of dwellings.

Since 1920 the company has adopted the course of forming building loan societies, the advantages derived from which are reserved to employees of the company. Eleven such societies have already been constituted or are in course of formation in the principal centres of the system.

Constituted in accordance with the laws concerning hygienic and cheap houses and small properties, these societies will enable employees to acquire or build healthy houses by granting them, thanks to State subsidies, loans repayable at a rate of interest from 3 1/2 % to 2 1/4 %, varying according to the family expenses.

The funds placed at the disposal of these societies by the State may exceed 3 million francs in the first year of their existence. Requests for advances have been presented and are under consideration. Under the text of the law, the individual repayable loans can only be granted where need can be shown; such loans will therefore be confined by our company to the subordinate and middle-grade employees.

The limitation of the number of rooms of which these dwellings may consist is expressly defined by legislation, which in the case of

the so called « cheap houses » fixes the letting value, and consequently the net cost of such houses.

The law requires these loans to be repaid within a period of 25 years, but as a rule the building loan societies fix the period for repayment at a maximum of twenty years.

The capital of these societies, which is in the nature of a guarantee on the State subsidies, is entirely found by the company; the societies are managed by active or retired officials of the company.

In addition to the advantages conferred on the building loan societies by the above-mentioned legislation, the company will undertake the preparation of designs and plans for the houses; it will also grant its employees a special rate of 0.04 fr. per kilometric-ton for transporting material to be used in the construction of these houses.

9. *F. St.* — Nil.

Great Britain.

10. *G. & S. W.* — No sums.

12. *G. E.* — The Great Eastern Railway Investment & Permanent Building Society was formed for the purpose of granting facilities to employees desiring to acquire the dwellings in which they live.

Italy.

17. *E. I.* — See answer of the question 2.

Norway.

20. *N. St.* — The Norwegian State Railways have available about 19 million crowns borrowed from the Railway Pensions Fund.

Out of this sum, loans against wages have been advanced to employees to the amount of 8 million crowns, divided between about 1 300 employees.

Further, advances of capital have been made amounting to 1 500 000 crowns, divided between 170 employees.

Holland.

21. *D. St.* — In order to secure the right to a certain number of the dwellings of these societies, the companies have interested themselves in the societies activities by special contracts and in other ways.

Sweden.

23. *E. S.* — The administration at present has a sum of 200 000 crowns at its disposal for the construction of these houses.

Switzerland.

25. *F.* — For years past we have placed at the disposal of those of our employees who desire to buy or build houses, as well as of employees' societies concerned in the constructions of dwellings, money from the pensions & benevolent fund in the form of repayable loans. These loans are also granted to employees and employees' societies who build with the aid of subsidies out of sinking funds.

Indian Empire.

30. *O. R.* — The Railway grants loans to employees who desire to build houses. The loan does not exceed twelve months' salary of the employee to whom it is made.

QUESTION 4. — *What are the sums that were allotted for this purpose up till 31 December 1920?*

France.

7. *P. O.* — See answer of the question 3.

Italy.

17. *E. I.* — See answer of the question 2.

Norway.

20. *N. St.* — See answer of the question 3.

Sweden.

23. *E. S.* — This sum only became available at the beginning of the current year.

Switzerland.

25. *F.* — Up to the 31 March 1921, we granted 850 repayable loans, amounting in all to 13 462 000 fr., to individual railway employees, and 32 to employees' societies to an amount of 4 666 000 fr. The rate of interest on these loans varies between 4 and 5 %.

QUESTION 5. — *Have these funds been placed at the disposal of the staff without distinction of class; and eventually what restrictions have been prescribed?*

France.

5. *F. East.* — Advances may be made without distinction of grade up to 2/3rds the value of the house; such advances, however, not to exceed one year's salary.

7. *P. O.* — See answer of the question 3.

Italy.

17. *E. I.* — No distinction of grade.

Norway.

20. *N. St.* — Loans and advances of capital are granted to staff without distinction of grade : but the advances of capital are only made in cases where the financial circumstances of the employees are such as to prevent them from building without assistance.

Holland.

21. *D. St.* — There is no distinction of grade.

Sweden.

23. *E. S.* — In view of the situation of the plots of land in question the loans will only be made to the workshop staff.

Switzerland.

25. *F.* — No distinction.

Indian Empire.

30. *O. R.* — Yes.

QUESTION 6. — *Have you limited the number of rooms which these dwellings may contain?*

In this case, what are these limits?

Belgium.

1. *E. B.* — No. The object has been to satisfy all reasonable needs of a normal family.

France.

5. *F. East.* — No. The persons concerned are themselves limited at present by the very high cost of construction.

7. *P. O.* — See answer of the question 3.

8. *P. L. M.* — Normal dwelling, minimum 4 rooms; higher grade employees, 5 rooms; locomotive, foremen and under-foremen, 6 rooms.

9. *F. St.* — No, but the houses constructed up to the present have a maximum of 5 rooms and a kitchen.

Italy.

17. *E. I.* — Under the rules laid down for economic houses, no dwelling may consist of more than 10 rooms.

Norway.

20. *N. St.* — Loans against wages are as a rule not granted for houses containing more than 2 or 3 rooms.

Advances of capital are not made in cases where the floor area of the construction exceeds 125 m².

Holland.

21. *D. St.* — No.

Sweden.

23. *E. S.* — There is no limitation to the number of rooms which a dwelling may contain, but the construction of small dwellings is encouraged.

Switzerland.

25. *F.* — No.

Indian Empire.

30. *O. R.* — No.

QUESTION 7. — *What are the arrangements in force for repayment to your company of the loans advanced?*

In how many annuities must they be repaid?

France.

5. *F. East.* — Loans repayable within a maximum of five years, with simple interest at 4 %.

Italy.

17. *E. I.* — Interest and loan repayment charges are deducted from salary or pension. The repayment of capital must be completed within a period of 50 years.

Norway.

20. *N. St.* — On loans against wages the repayment is as a rule from 1/2 to 2/3rds of the total sum, and it is spread at nearly equal intervals over a period of from 35 to 45 years.

As regards advances of capital, nothing has been decided as to eventual repayment.

Holland.

21. *D. St.* — No general arrangements have been made; each case is dealt with as it arises.

Sweden.

23. *E. S.* — The annual payments are made as follows :

In the first two years interest at the rate of 5 % is paid only. During the subsequent 15 years there is payable, in addition to this interest, a repayment charge of 7 % on half of the total of the building loan. During the remaining portion of the period of repayment, the annual charge will amount to the same sum as for the 17th year.

Switzerland.

25. *F.* — We require the repayment of the loan at the rate of 1/2 % per annum.

Indian Empire.

30. *O. R.* — Loans are recovered by deductions from salary, equal to 1/48th of the amount of the loan.

QUESTION 8. — *What is the general experience of your company from economical, social and administrative points of view in respect to finding for their employees suitable housing conditions?*

Belgium.

1. *E. B.* — The object aimed at by the administration is to secure the necessary supply of personnel; to diminish the cost of service at certain level crossings by replacing men by women; to have employees within reach in case of accident; to ensure more efficient superintendence of the line.

Denmark.

3. *E. D.* — From the administrative point of view there is the advantage of being able to distribute employees in different places as desired.

France.

5. *F. East.* — The possibility of finding sufficiently satisfactory lodging in devastated areas or in country districts where considerable additions to personnel have been necessary.

6. *M. F.* — The efforts made by the company to secure suitable housing conditions for its employees do not appear to have had any result from the administrative point of view.

7. *P. O.* — The Orleans Company does not doubt that these building loan societies, under its direction, are destined to fulfil a role of increasing importance; it therefore contemplates the immediate increase of the capital of certain of the societies and the creation of new societies wherever the need for them becomes apparent.

These societies are of too recent creation for it to be possible to draw conclusions as to their working, but there is every reason to hope that the action taken by the Orleans Company will greatly benefit railway employees, not only of the company but of the country as a whole.

9. *F. St.* — The dwellings which the system provides for its employees are well ventilated and spacious; their nearness to the place of work removes their occupants from the temptations of town-life; the small garden provides a healthy and profitable recreation; the rent is generally much lower than that paid in the locality for houses which often possess very defective sanitation.

It is certain that any financial assistance which the system might give to individual initiative would have the result of increasing

the loyalty of its employees, but the financial conditions under which the system is conducted do not permit this; its assistance therefore is purely moral and confined to encouraging or guiding this private enterprise.

Great Britain.

10. *G. & S. W.* — The experience of this company in respect of providing suitable houses for their employees has not been economically or socially successful, but is favourable from an administrative point of view.

12. *G. E.* — The staff live quite near to their work, so that they are within call when required.

Italy.

17. *E. I.* — The first houses have only just been completed. It is therefore impossible as yet to give any information on this point.

Holland.

21. *D. St.* — Less difficulty in finding new employees and in transferring personnel from one place to another.

Switzerland.

25. *F.* — Employees who have become owners by the aid of loans from the administration benefit morally and economically from the fact of ownership. The re-action of this on the railway service cannot yet be appreciated.

Indian Empire.

30. *O. R.* — It is good policy to see that the staff are decently housed.

[385 .4 (.494)]

The Reconstruction of the Organization and Administration of the Swiss Federal Railways,

By R. WINKLER,
DIRECTOR OF THE FEDERAL DEPARTMENT OF RAILWAYS BERNE.

By its reference dated the 16 June 1921 the Swiss Federal Council put before the Chambers a Federal Bill for the reconstruction of the organization and administration of the Federal Railways as well as a draft order for putting the provisions of the Act into force. As several periodicals have already dealt with this question we are of the opinion that an authentic extract from the documents would be welcomed by the readers of the *Bulletin*.

If, however, it is desired to examine this matter closely, it is essential to have some knowledge of the constitutional bases on which the Federal Railway undertaking is founded. We may here remind our readers that Switzerland is a democratic federation, consisting of twenty-five cantons and demi-cantons and that the people are the sovereign authority; a modification of the constitution not only requires an absolute majority of the enfranchised citizens, but also of the cantons (*obligatory referendum*). The voting takes place by cantons, in each commune, on the same day throughout the country; the result of the whole of the voting is determined by the majority of the electors, each of whom has only one vote, and the vote of the cantons and demi-cantons is decided by the absolute majority of votes in each of them. A law can only be passed if it has received the approval of both Houses, that is, by the National Council, representing the people, in the ratio of 1 deputy per 20 000 inhabitants, and by the Council of States representing the cantons in the proportion of two delegates per canton and one delegate per demi-canton (44 delegates). It is necessary to refer to the fact that in the Council of States the influence of a canton of small area, as in the case, for example, in the canton of Zug which has only 31 569 inhabitants, carries just the same weight as that of a large canton, such as that of Berne with a population of 674 194. When a law that does not involve any modification of the Constitution has been passed by both Houses, 30 000 citizens having the right to vote may, by appeal to the *facultative referendum*, ask that this law shall be subject to the vote of the people, and in that event it is by the majority of the voters alone that the question is decided. Under these conditions it is evident that, taking into account the diversities that exist in Switzerland in race, in language and in religion, it is not easy for any law to be adopted, and still less for any modification to be made in the Constitution, particularly if there should be strong opposition in any considerable portion of the country. As an illustration of this statement, we may quote the fact that at the voting of the people on 16 May 1920, following an obli-

gatory *referendum*, the modification of the Constitution concerning the adhesion of Switzerland to the League of Nations was accepted by the people by 416 870 votes against 323 719 whereas 11 1/2 States only (against 10 1/2) voted in the affirmative. It will be seen that notwithstanding a majority of over 90 000 votes, on the one hand, the question rested with a demi-canton as to whether Switzerland should refuse to be associated with the League; and this is what would actually have occured if, in one of these demi-cantons as few as 96 voters had voted against it instead of in its favour.

From the preceding it follows that a number of the provisions of the Constitution and of the Swiss laws bear the impress of compromise directly due to the consideration of the political influence of the *referendum*. Thus the Act relating to the purchase of the railways, of 15 October 1897, after having been amended in many respects in debate, contrary to the intention of those who framed it, was accepted by an unexpected majority (386 634 votes against 182 718). It is such reasons as these, due to the operation of the *referendum*, which have led the Federal Department of Railways in the present case not to accept the solution suggested by some of the experts consulted as being the best, but to await the time when it would appear capable of realization from the political point of view, while at the same time seeking to obtain the maximum advantage possible both for the Administration and for the whole of the population.

The following is an extract from the reference of the Department in question. The Bill was drafted after having been submitted to a Commission consisting of those men considered to be the most competent authorities in the country on railway questions; as well as the draft of the order for putting this Act into force.

A. — Reference.

Chief points to be considered in the reorganization.

1. — General.

The first object of reorganization should be to simplify considerably the overweighted machinery of Administration, in order to obtain greater rapidity in dealing with business and to effect all possible economy. All schemes for reconstruction are agreed as to this object. It is consequently necessary to try to find means for avoiding all needless repetition, to reduce checking to that which is strictly necessary, and to suppress all useless reports. The internal structure and organization of the Administration should already be sufficiently simple, rational and economical so that the whole of the management should feel its influence, and it ought not to be necessary to have to move in this direction owing to external forces and the hardness of the times. The number of officers and directors and generally the entire staff of officials should be reduced to the lowest number possible as this is the most certain way of simplifying administration and preventing it becoming an unhealthy bureaucracy. It is necessary above all to practise economy in the employment of the staff throughout, and the example should come from the top.

There can be no difference on these general principles. Opinions can only begin to differ when it is a question of deciding the form of the Administration. For this reason it is necessary to set out some fundamental considerations on the subject. In its report of 6 August 1917,

attached to its scheme for a more concentrated centralization, the General Direction has made the definite statement that it advised a reorganization which according to its firm conviction as considered *from the point of view of the Administration* appeared to it the most rational and most advantageous. « It was not our mission » it stated, « and as an Administrative authority it was not our business to introduce into our scheme either motives of opportunism or considerations of political or regional interest ». This way of looking at the problem can certainly be understood, but it should not form the sole criterion for the study of the problem for it is certain that the Administration of the Federal Railways could not confine itself entirely to its own ends; it has to serve the country and, consequently, to vary its outlook to some extent according to political views, according to the needs and to the point of view of the country. It is also of first importance that it should adapt itself as far as possible to other public Administrations in order to avoid opposition and conflict which would only render its task more difficult and alienate sympathy from it. A certain degree of popularity is necessary for a railway Administration which, more than any other enterprise, is in constant contact with the authorities and with the population. Its organization consequently must not fall foul of the ideas of the country.

2. — Comparison with the organization of foreign railway Administrations.

We have stated that the organization of a State Railway Administration should take into account the other political and administrative institutions of the country; this aspect is confirmed by the study of the railway Administrations of neighbouring countries. These Administrations are organized in ways which differ very much from one another and they could not serve as a model for Switzerland and for its national railways. In this respect we should take as independent a course as other States have taken. Moreover, in those countries which were engaged in the war many profound changes have taken place in the whole structure of railway administration as the result of the numerous disturbances it caused, and it is not possible, even at the present date, to come to a clear conclusion on the nature and the consequences of these changes.

One is liable, moreover, to fall into certain errors when an attempt is made to obtain statistical comparisons between railway organizations based upon the ordinary published figures. The principles on which these statistics are made up and the manner in which they are set out are in fact far from being uniform; frequently the different designations for the same thing or the same operation produce a totally incorrect impression. When, for example, one hears that the great French Railway Companies are managed by a single general manager without the collaboration of other managers, it must not be forgotten that there are numerous higher officials in these concerns who, though not perhaps given the title of manager, yet have the powers and as a general rule have even greater jurisdiction than the managers of the Federal Railways. It is necessary that we should refer to these peculiarities because it is not uncommon to hear incorrect comparisons made of this kind.

3. — Position of the Administration of the Federal Railways in relation to the General Administration of the Confederation.

Among the peculiar questions which one should take into consideration in reorganization, it is necessary to refer in the first instance to the position of the Federal Railways in relation to the

General Administration. At the time of the drafting of the Act of 15 October 1897 for the purchase of the railways, it was considered to be a political and economical necessity to give to the Administration of the Federal Railways wide autonomy and great independance. This principle was admitted unanimously. The experience gained up to this date had confirmed the accuracy of this aspect of the question which, for technical administrative reasons, should hold equally good to-day. An enterprise of the kind, extent and importance of the Federal Railways has need of much greater liberty of action than other Administrations directly dependent on departments of the Federal Council, which are far from having the same commercial and industrial character. We are of the opinion that, even from the point of view of public and administrative rights, there is no reason for any modification of the organization in this respect, provided that, for the rest, the Swiss Federal Council on its side preserves towards the Administration of the Federal Railways the position that has been assigned to it by the Constitution.

We are therefore of the opinion that it will not be opportune to place the Federal Railways under the immediate direction of the Department of Railways. This system, moreover, would have the result — and this further strengthens our argument — of overloading this Department and the Federal Council itself, without any real necessity, by obliging them to intervene directly in the numerous details of railway working. Nor is it desirable that the supreme executive power should have to concern itself, more than has hitherto been necessary, with differences of opinion on technical and administrative questions.

But, on the other hand, we could not say that we are in favour of absolute autonomy for the Federal Railways analogous, for example, to that of the National Bank or of the National Insurance Fund for Accidents, because the relationship between our State Railways and our national economy is closer and more complex. The fact that the budget of the Federal Railways is, or may be, greater than the whole budget of the State also requires that the Parliament and Government of the country should have some share, in the management of the undertaking. We also think it equally desirable that the Federal Council should have the power to give such instructions as it may think necessary for the interest of the country to the Administration of the Federal Railways, a power which, in our opinion it already has in virtue of its right of supervision.

4. — Centralization or decentralization.

Should one centralize or decentralize? This question has an importance, in relation to the reconstruction of the Administration, that is much greater than the question of the national rights over the Federal Railways that we have examined in the previous paragraph. We here approach the problem that comes first in public opinion and which, up to the present, has prevented a generally acceptable solution being found. It is therefore necessary before examining the details of the Bill to clear up this fundamental point. We have already drawn attention to the fact in the general section of this chapter, that a public administration, and particularly a railway administration should make efforts to adapt itself as much as possible to the other institutions of the country and to the views of the population. That is to say there can be no question, in the administration of the Federal Railways, either of absolute centralization or of decentralization pure and simple.

Given the diversity of races and languages of the Swiss people, as well as the code of public laws of the country, it is often necessary to adopt special treat-

ment for different districts. The Federal Railways are, more than any other administration, in constant relation with the authorities of the cantons and of the communes as well as with the public. Their administration must not therefore be too centralized if it is to satisfy the numerous needs of the different districts, of centres of traffic, of industrial groups, etc.

But, on the other hand, a railway administration is in many respects obliged to assimilate its services and methods of working and establish rules which apply to the whole system. It must treat passengers and merchandise in the same manner throughout the whole country, and the same rules must apply to the staff everywhere. It must require the same economy from all branches of the Administration, whatever they may be; and the same consideration for the position of the undertaking as a whole and the available resources for the completion of the railway system ought to be applied on uniform principles according to the needs of the whole. This system which extends over nearly 1 864 miles must also, to some extent, form a complete unit for fixing the time-table and working arrangements. Even the strongest opponents of centralization do not dispute that in this province unity is necessary to good working of the Administration. But is also follows that no one would wish to model the Administration of the Federal Railways entirely in accordance with his political ideal for the Administration of the State, whether that be to centralize it or to decentralize it completely. For reasons which are inherent to the very nature of a railway undertaking, it is necessary to adopt a special point of view if one wishes to form a judgment on the form of the Administration of the Swiss Federal Railway. This point of view is not that of pure politics and in the question of reconstruction with which we are concerned, we consider it a mistake to attribute too great political importance to axioms of centralization and decentralization. In our opinion people attach too much importance to these *terms* the more so because they are used to represent a complete programme. It would be better to consider impartially up to what point a uniform management is indispensable for the Federal Railway Administration, both in its own interest and that of the country, and also up to what point the free right of decision may be given, without disadvantage, to the external administrative bodies among whom we also include the District Directions. In order to avoid all misunderstanding we will expressly state that we consider it useful and necessary to give autonomy to the local administrative bodies with as great independence as possible.

5. — Extension of the jurisdiction and of responsibility of the local services.

In our opinion increase of the independence and responsability of the local services is one of the best methods of simplifying the Administration of the Federal Railways. In considering, at the commencement of this reference, the gaps in the actual organization, we have already drawn attention to how far the regulations relating to the powers and jurisdiction of the various services have been multiplied in course of time, and we have drawn attention to the reduction of the independence of certain services, and to the discontent which has been occasioned thereby. It is not too soon to begin to apply a serious remedy to this condition, and our intention on this matter is clearly stated in the Bill (Art. 1, § 2). The increased powers of certain bodies will ensure simpler and quicker dealing with business and will contribute greatly to smoother working of the staff.

The Department of Railways gives the greatest attention to this side of the

question of reform; it has already undertaken the necessary steps for determining, with the assistance of the staff, the direction and extent to which it may extend the powers of the smaller and subordinate sections. For the higher bodies the solution of this problem will be found in the Bill, in the order for putting the Act into force, and in the organization of the services which the Administrative Council will determine.

6. — Points with which the amendments in the Act should deal.

The purchase of the Railways Act of 15 October 1897 consists of two main parts : the provisions for the *purchase of the railways* by the Swiss Confederation and requirements for the *administrative organization of the Federal Railways*. With a view to the immediate necessity of reconstruction we think that all discussion which has no direct reference to the object of our Bill should be left aside. For this reason we are only taking into consideration the provisions relating to *organization*. It follows that Articles 1 to 4, 6 and 9 of the Act, which deal with the purchase of the railways, as well as Articles 49 of its final provisions, are not touched by the proposed amendments; they are accordingly retained without any change. We are, moreover, relieved from having to include in the Bill, Chapter II, par. 4 : « General provisions » Articles 40 to 47 of the present Act which regulates the appointment and conditions of service of the officials and employees on the Federal Railways, for it is intended to settle these conditions in a uniform manner, for the whole Administration of the Confederation, in the new Act relating to the salaries and wages of the staff. While waiting for the passing of this Act the legal provisions which will regulate the personnel of the Swiss Federal Railways are those of the present Act.

Provisions of the Bill.

I. — General provisions.

Art. 1. — According to the wording of the first paragraph of this Article, the desire has been clearly to shew, once and for all, that our greatest national transport undertaking should become neither a purely financial concern, which would imply the abandonment of the general interest of the country in the undertaking, nor that it should completely depart from working on strictly economic lines. It has appeared necessary to give this explanation because partisans are always to be found for one or other of these extreme views.

In the second paragraph the final phrase alone is new. Experience having shown that it is not uncommon for higher authorities to trespass on the province of those below them, it does not appear superfluous to express herein the direct intention of the legislature to secure the greatest amount of independence possible for the different services.

Art. 2. — The three first paragraphs of this Article are identical in substance with paragraphs 3 and 5 of Article 12 of the existing Act.

The fourth paragraph, on the other hand, modifies the existing state of affairs, in so far as it totally suppresses, or rather that it limits to free agreement between the parties, the power of the Federal Tribunal to deal, as the sole court, with civil actions brought against the Federal Railways by corporations and individuals, when the sum involved in the litigation amounts to at least 30 000 fr. Experience has shown that there are disadvantages in imposing upon the Federal Tribunal the onus of the trial of such actions. Otherwise the proposed provision conforms to the system enforced under Article 25 of the Act regarding the responsibility of the railways, dated 28 March 1905.

Art. 3. — The first paragraph combines the provisions of paragraphs 1 and 2 of article 10 of the existing Act, relating to the privilege possessed by the Federal Railways with regard to taxation.

The provision of the second paragraph is taken from the scheme of the Administrative Council. It replaces paragraph 3 of Article 10 of the existing Act.

Art. 4. — This Article which corresponds to Article 11 of the existing Act, determines to what extent Federal legislation relating to railways is applicable to the Federal Railways, independently of the Acts that deal particularly with the administration of the latter.

The second paragraph stipulates that, in particular, the application of the provisions of the general legislation, relative to the supervision and the control of railway and navigation undertakings by the Confederation does not apply to the Federal Railways. In our report on the management of the Department of Railways in 1918 we have drawn attention to the fact that, up to that time, the Federal Railways had been subject to technical control in the same manner as private undertakings. « So intense and continuous a superintendence of a national undertaking (which itself has a graded organization), by another official body is », we have stated, « an anomaly that only impedes business; in fact it sometimes results from this that work is done twice over, quite superfluously, the expense of which cannot be justified. The Department of Railways had therefore thought of limiting the control of the Federal Railways to within limits strictly necessary ». These measures were approved and further particulars in detail were given at the time of accepting the report on the management. The simplification of control, which came into force on 1 October 1919, has given complete satisfaction in all respects. It has moreover contributed to effecting somewhat important economy, because it is no longer necessary to relieve the superintending engineers, responsible for the supervision of the Federal Railways, during their holidays and the Department of Railways has, moreover, been able to effect many simplifications. The provision made in the second paragraph of Article 4 will enable this new order of affairs to be maintained in the future. If circumstances should render the control of the Federal Railways really necessary this may be exercised in the future by virtue of the powers reserved to the Federal Council under Article 6 of the Bill and under the special Acts regulating the Federal Railways.

II. — Powers of the Federal Assembly and of the Federal Council.

Art. 5. — This Articles replaces, in a rather more concise form, Article 13, sub-head A, of the existing Act. From a material point of view it varies from it only in the one respect that of giving to the Federal Council the function of approving contracts for the leasing and working the railways, which is to-day the province of the Federal Assembly.

Sub-head 3 legalizes the existing practice.

As the revision of the Act tends above all to simplify the administration by reducing the number of authorities, it might be asked whether it was not intended to refer the estimates for approval to the Federal Council, as was already proposed in 1902 by the Commission on the Federal Railways appointed by the Council of States. This innovation whould have an advantage in that it would not be necessary to prepare the estimates by June, as is at present the case, but only in October, which would enable them to be closer to the final figures. We have, however, abandoned this point, because we are of the opinion

that in proposing the reduction in the number of members of the Administrative Council, it is not advisable at the same time to limit the rights of the Federal Assembly with regard to the estimates; this is still less the case because the cantons, which, in the future, will not be represented on the Administrative Council, would find themselves deprived of the power of indirectly exercising a certain influence on the management of the Federal Railways by their representatives at the Federal Assembly. Moreover, in view of the importance of the railway estimates it is necessary that the right to discuss them in Parliament should be preserved.

Art. 6. — A new form of laying down the powers of jurisdiction of the Federal Council has been adopted without making any important material modifications in this respect.

The question of knowing whether the Federal Council is authorized, by virtue of its constitutional position, to give instructions to the Administration of the Federal Railways, has already led to controversy. In 1908 the Department of Railways thought that the question should be answered in the negative; but the Commission of Federal Railways of the National Council questioned the justice of this point of view and, amongst others, made the following remarks in its report on the estimates of 1909 : « If the Federal Council does not consider it has this jurisdiction (of giving orders to the Administration of the Federal Railways) — which we are unable to admit because the Federal Railways are subordinate to its authority in common with other Federal Administrations — it is necessary that the law should provide it ». The regulation proposed in the first paragraph of Article 6 has for its object the clearing up of any doubt on this subject in the future.

With regard to sub-heads 3 and 4*e* of Article 6, we will refer to what we have already said with regard to Article 5. The modifications in the actual state of affairs, made under sub-heads 4 *a—e*, are a result of the recommendation of the technical control of the Department of Railways. The provisions of sub-heads 4, *d*, *f*, and *g* relate to the existing mode of procedure and to the general legislation affecting the railways.

III. — Administration.

Art. 7. — Contrary to the existing Act which recognises four Administrations the Bill only provides three. It is, however, only a modification in form, because the General Direction and the District Directions are combined under the collective heading of « the Direction ». By this it is desired to show that « the Direction » should form a homogeneous whole in which the General Direction and the District Directions cannot oppose each other, as would be possible with independent administrations which might occasionally follow different lines of action. When it is a question of the examination of the measures to be taken, the District Directions will express their opinion without any restriction. But when a decision has been arrived at on any question, it must be considered as the sole opinion of « the Direction ».

1. — Administrative Council and Railway Councils.

Arts. 8 to 10. — One of the most striking and most important modifications of the Bill deals with the composition of the Administrative Council. The present body of 55 Members is undoubtedly devoid of flexibility and scarcely able to discuss the minor details of business that may be submitted to it. It was therefore of prime necessity that a small committee should be created for the preliminary investigation of such matters; this « Permanent Commission », at the

present time, consists of a president and of ten members. This Commission, the members of which alone are required to investigate in detail all questions relating to the railways, has, by its office, acquired a preponderating influence as the advisory body in the General Direction and as the consulting body of the Administrative Council which, it will be recognised, is of advantage to the undertaking. In this scheme for the amendment of the Act of Purchase, the Administrative Council proposes to transform the Permanent Commission into a special Administrative body, with power to settle directly a certain number of matters actually within its juridiction. This modification will certainly diminish the want of flexibility which was the fault of the Administrative Council. But this proposition itself strengthens our conviction that the true solution should be sought in the replacement of the Administrative Council by a much smaller body. This may be adopted without hesitation after the conclusive experience gained with the Permanent Commission. The decisions of the Administrative Council have but rarely differend, up to the present, and that only on questions of small importance, from the resolutions passed by the Commission.

A smaller administrative body could meet more easily and more often, which is particularly important with a view to the simplification of business; it could also treat these matters more rapidly and consequently more thorougly than a large assembly of 55 members.

It has also frequently been found that the Administrative Council, according to its actual constitution laid down by the Act, comprising people who have to safeguard interests that may be in opposition to those of the railway undertaking may, consequently, find itself in a doubtful position which is not without inconvenience to the best interests of the Administration. It is natural that the Federal Railways should take into account the requirements of the various districts of the country, of the different classes of the community, and of the staff; but it is not the business of the Administrative Council, which is at the same time the highest authority giving a decision, that it should be called upon, as is the case to-day, to instruct the Administration of the desires and demands of interested parties. An expert consulted by the Department of Railways made a very true remark when he said : « Either one must consider that the Administrative Council represents those interests which affect the railway, but are not properly speaking those of the undertaking which thus form a connecting link between the latter and the outer world; in which case one may give a large representation to the different interested bodies whether economical or political; but in that case it is necessary that this body should not decide, but should only make recommandations. Or, if one does not wish to entrust the decision on the most important matters of the Administration to the small Council of Directors, then, it is necessary that the Administrative Council should consist of people possessing as much, if not more, experience in railway matters than the Directors themselves. »

« In plain language, there would be no reason to suppress the Administrative Council, for it is both good and useful that the direction of the undertaking should remain in permanent contact with those economic bodies which it is its primary duty to serve. But a council of this class cannot at the same time undertake the Direction of the railway; it must be content to lay down general recommandations, to make proposals, to point out objections, etc. »

Our proposals with regard to the future composition of the Administrative Council aud the Railway Councils agree in substance with this point of view.

The Administrative Council proper, which ought to supervise the business, and to which is reserved the direction-in-chief and the jurisdiction for definite decisions, should consist of a small number of specially qualified persons, kept in close and permanent contact with the undertaking. The reduction in the number of members to eleven, as suggested in the Bill, has been dictated by the fact that any increase would require further Commissions, which should be avoided. In so far as the powers and jurisdiction of the Administrative Council are concerned the Bill does not introduce any modification of great importance into the present state of affairs.

Arts. 22 to 25. — With regard to district Councils it is proposed to retain these, but to give them another form; they will serve as a liaison between the Railway Administration on the one hand and the authorities and the inhabitants of the cantons they represent on the other. It is recognized that, under this new form, they will exercice a beneficent influence for all. For reasons which have been set forth above and in view of the fact that the object of the revision of the Act is to make the Railway Councils responsible for a decisive action taken by the Administration. Their position could only be that of a consultative body. It is for this reason it is intended that they should act as advisers to the district directions and to keep them informed on the requirements of the traffic and the wishes of the population, and thus to safeguard the Cantonal and local interests, according to their merits, in all important decisions that have to be taken on railway matters.

According to the Bill the Railway Councils will meet once or twice a year, in common session, on the summons and under the presidency of the head of the Department of Railways; the members of the Administrative Council, the General Directors and the District Directors will also attend these meetings. These discussions in common will give, to those taking part in them, the opportunity of comming into contact with and arriving at decisions on questions of general importance relating to the Federal Railways as well as on the resolutions and suggestions submitted; they will further increase the influence of the Railway Councils, because the President, by reason of his position as the representative of the supervising authority, will be able to watch that the recommendations which have been expressed are properly investigated. It is hoped that this institution will prove to be really useful and will contribute in a large measure to the maintenance and encouragement of good relations between the public and the Administration of the Federal Railways.

By the terms of the Bill each Railway Council will consist of from 20 to 25 members. The order for putting the Act into force provides 24 for each of the three Districts. It would have been preferable if these Councils had been made still smaller; but the fact that the central district extends over thirteen cantons of which each must have one representative renders any considerable reduction in the number of the members impossible.

Each of the Railway Councils will also be represented on the Administrative Council by a delegate. Moreover cantons and councils will have the opportunity, as in the past, of presenting their resolutions to Parliament, at the time of the discussion of the estimates and of the accounts of the Federal Railways. Moreover the most important councils of the country are also represented at the Commercial Conference of transport undertakings and of those interested in the traffic,where they may also make known their wishes on all questions of transport and tariffs.

2. — General Direction.

Arts. 12 to 16. — If two Districts are eliminated, if direct relationship is effected between the heads of divisions and of the « General Direction » and those of the « District Directions », if written reports are reduced and if the other simplifications are brought about that have been suggested, it will be seen that three General Directors will be sufficient for the administration of the whole undertaking. But experience has shown that it is well that the President of this General Direction should have a special position, which should enable him to intervene in all the services of the Administration and to give instructions where he may judge it to be necessary. The homogeneity and personal responsibility of the higher direction are thus more clearly expressed.

The sphere of activity of the General Direction will be slightly extended in the sense that the chief workshops and the finance departments will come directly under it. The bringing together of these services under a single head will permit of a reduction in their staff and of the capital invested in the equipment, will facilitate the purchase of material and will afford many other advantages.

The draft of the order for putting the Act into force sets forth that the business of the General Direction will be distributed between the President's department, a works and traffic department and a department for claims and rates. The fusion of the actual works and traffic departments under one head will be a further guarantee that the execution of the works will meet the actual requirements of the traffic department. The 17 divisions of the General Direction will be reduced to 13 with a view of avoiding all unnecessary work.

3. — District Directions.

Arts. 17 to 21. — A railway undertaking of the magnitude of the Swiss Federal Railways could not be managed satisfactorily in its extreme ramifications by a central direction. Intermediate bodies are indispensable; such exist moreover on all foreign railways, and one Administration only differs from another in name and in the powers given to them.

The geographical conditions and the constitution of the Swiss Federal States have shown from the commencement that it is advisable to divide its national railway system into Districts having a relatively marked degree of independence. For this reason the Bill does not suggest to the General Direction that the Districts should be abolished; it simply removes the existing head and the District Council of each in the form in which it exists to-day. This Bill preserves the limits of the Districts and gives the management of these to the heads of sections who exercise this power partly individually and partly collectively.

It is therefore not possible to contemplate the total suppression of the Districts, a cry which has become a watchword for many. Nor would it be a question of satisfying the desires of those who wish to give the Districts almost complete autonomy. By doing this one would sacrifice one of the essential advantages of nationalization. The autonomy of the Districts must necessarily be kept within limits reconcilable with the principle of unity, which should govern the working of the whole of the railway system so that the working may itself be rational, and with the right, possessed by all the different parts of the country, to be treated on an equal footing. It is on this ground that the present Bill is based.

The objections that have been raised to the existing organization apply, moreover, less to the Districts as such, than to their *number*, to their *form*, to the too numerous *bodies* with which they are endowed and particularly to their *relationship with the General Direction.*

The *duties* of the District Directions are reduced by the Bill so far as the placing of the finance departments and the chief workshops directly under the General Direction. But, on the other hand, the procedure in force for the execution of new works, of alterations and of completions will be simplified and the jurisdiction of the districts will be increased, because, after the discussion of the annual estimates,the works that the District Directions will be able to carry out, without previous approval of the schemes by the General Direction, will be settled. In respect to new works, the Bill provides, moreover, that the District Directions will co-operate in efforts tending to attract traffic, will take account of the commercial situation in the various parts of the country, so far as this is of interest to the Federal Railways, and will report on this subject to the Central Direction.

The present *number* of District Directions does not respond to the technical requirements of the service; it is common knowledge that it is a result of concessions which it was thought ought to made at the time of purchase. But this division has not come up to expectation. It has formed an obstacle to unity of management and working; it makes the administrative machinery too complicated thus involving considerable and useless expenditure which it is essential to avoid if the question of effecting economy in the Administration is to be undertaken seriously. To arrive at a really effective improvement in the organization, the railway system must be subdivided according to the great natural currents of traffic and for this the five existing Districts would be replaced by three Districts only, that is one for Western Switzerland, one for Central Switzerland and the third for Eastern Switzerland. This reduction will also permit of giving a greater freedom of movement to the District Directions in many respects; it will also facilitate the selection of men really capable of occupying the higher positions.

The first Bill for the purchase of the railways in 1897, which already contemplated the division of the railway system into three Districts, recommended that the headquarters of the Directions should be in the towns of Lausanne, Lucerne and Zurich. The motives which prevailed at this time in favour of this proposition have retained their full value to-day. We need not enlarge on them again. On the other hand it is well to consider whether, and to what extent, it is possible to make some compensations to the towns of Bâle and Saint-Gall which lose their existing District Directions, by moving certain services which need not necessarily be installed in the same towns as the Direction. Two sections here come under consideration, these are the new general finance department and the control of receipts. In view of the important position of Bâle as the junction point of the three Districts and as the point of transfer between the river and the railway traffic it is proposed to instal here a higher traffic official with responsibility proportional to his duties. The General Direction has declared itself disposed to accept the slight disadvantages resulting from this transfer of certain services if it is possible by this means to realize the much more important gain in a reduction in the number of Districts. By dividing the railway system into three parts only it will be possible to obtain the administrative simplifications contemplated by the General Direction in its scheme of 1917, without having recourse to a centralization which is too rigid and against the

wishes of a great portion of the Swiss people; this division moreover will effect real economy.

The Directors of the future Districts will have as their duty, according to the Bill, the representation of the Federal Railways in their dealings with the Cantonal and Communal authorities, on all important questions concerning their District. They will watch that good relations are maintained with these authorities and will also enter into relations with economic and industrial groups, in order that they may be kept informed of the needs of the traffic of the different districts of the country and be able to report to the General Direction. They will devote special attention to questions relating to the staff; they will be particularly responsible for the regular working of the business and traffic of their District. They will see that the sections placed under their orders shall act according to the intention and desires of the direction of the undertaking and help each other efficiently in the accomplishment of their duties. The District Directors will not interfere in the work of the sections which, under normal conditions, receive their technical instructions from the heads of sections of the General Direction, unless the interest of the Administration or of the business should so require. The heads of sections will inform the District Director by regular verbal reports on the course of business and, on so doing, will receive his instructions and advice. Moreover the present meetings of the District Directors which take up a lot of time will be abolished. The Directions at Lausanne and at Zurich already work in this manner with the best of results.

The highest importance must be attached to the judicious arrangement of the *relations between the General Direction and the District Directions*. This is one of the weakest points in the present organization. This organization overloads and complicates the course of business; it is a source of a great deal of overlapping. To remedy this state of affairs, it is indispensable that the heads of sections of the General Direction should have the power of corresponding directly with the sections of the Districts, without going through the Directions, as is at present the case; it is also necessary that they should be able to give the special technical instructions that may be necessary to these sections relating to the regular working of the service. The requirements that may be laid down by the Administrative Council for the different services will provide more detailed rules relating to this matter.

Moreover a closer contact is provided between the General Direction and the District Directors in order that the necessary unity of purpose and views of the direction of the undertaking may be observed in the Districts. The General Direction must therefore hold conferences, at least once a month, with the District Directors in order to communicate their intentions to them, to keep themselves abreast of the business, and to discuss important matters. The District Directors will assist, moreover, at the meetings of the Administrative Council and of the Railway Council. Written reports will be limited and replaced as far as possible by oral information.

Instead of the seven services which the District Directions comprise at present there will be only three sections in accordance with the scheme of the Administrative Council. The offices for claims and accounts will be combined in the office for establishments so as to form an administrative section. The finance departments will be centralized and the secretaries of the District Directions will disappear in so far as they form special sections. As the chief workshops will be under the orders of the General Direction, the technical portion of the traction department will be reduced in the Districts; this will

permit of combining the sections of the chief traction engineers with those of the chief of the traffic, and thus a closer liaison will be obtained between these two services in accordance with the nature of their duties.

IV. — The accountancy of the Federal Railways.

The accountancy of the Federal Railways was heretofore regulated by Articles 7 and 8 of the Act of purchase dated 15 October 1897, by Articles 55 to 64 of the regulation for putting the latter into force and by the Act relating to the accountancy of the railways, so far as determined by the Federal decree of the 13 November 1906. At the present day these requirements are completed by the Federal Act of 16 December 1920 which has replaced Article 7 of the Act of purchase by two new articles increasing the period for the amortization of the debts, from 60 to 100 years. It is desirable to combine the more important of these provisions in a special chapter of the new Act by introducing modifications which have proved themselves to be useful and placing the others in the order for putting the Bill into force so that the accountancy of the Federal Railways may be regulated in the future exclusively by these two legislative measures.

The provisions of the Bill give rise only to the following further remarks :

Art. 28. — It is not possible to agree with the proposition, frequently brought forward, to abolish the renewals (sinking) fund of the Federal Railways. This fund serves to compensate certain decreases of value in the assets shown in the balance sheet. At the time of the discussion on the Act relating to the accountancy of the railways it was insisted that this fund was in fact intended to ensure the correctness of the balance sheet; if only for this reason we think that the renewals fund should be maintained and in this we are in accord with the General Direction and the Administrative Council of the Federal Railways. The application to the latter of the provisions of the Act relating to the accountancy of the railways in respect to the renewals fund, for renewals under the Administration of Telegraphs,should also be formed within the meaning of the Act relating to the accountancy of the railways, thereby showing that in its opinion the observation, by the Federal Administrations, of the requirements regulating this matter was necessary in the interest of sound finance. It would moreover be very difficult to maintain the provisions of the Act relating to the accountancy as applying to the private railways if, in the case of the Federal Railways, any deviation were made from the principles of this Act, the application of which has been considered, hitherto, as being of the very essence of good administration.

Art. 29. — At the time of the examination of the report on the working of the Federal Railways for 1911 a lively discussion was raised at the Federal Assembly on the question of the utilization of the net revenue. It was unanimously recognized that the requirements of Article 8 of the Act of purchase did not meet the end in view and the Federal Assembly recommended a revision of that Article in this respect.

On the demand of the Department of Railways the question was the subject of a thorough examination on the part of the General Direction and of the Administrative Council of the Federal Railways. In November 1913, the latter proposed a new form for the said Article 8. But as the question had lost considerably in importance, because of the results shown by the accounts since the commencement of the war, the Department of Railways did not at that time follow up the proposal made by the Administrative Council.

Although, in view of the present situation of the Federal Railways, it does not appear to be a matter of urgency to regulate the use of the net receipts in a new way, it is necessary however to avoid introducing into the new Act the provisions of Article 8 of the Act of purchase, because it has been recognized that this does not correspond to the end in view. A draft is proposed for Article 29 of the Bill which agrees in substance with the terms put forward by the Administrative Council.

In the second paragraph of the said Article, the credit balance of the profit and loss account is, in such case, carried forward until it amounts to 5 % of the total amount of the working receipts for the annual period; the excess if any, is paid into the reserve fund, which, according to the third paragraph, serves to cover extraordinary expenses as well as the deficit which may be found in the profit and loss account. A carrying forward of the credit balance, until it amounts to the total mentioned above is indicated, because when the credit balance of the profit and loss account is high a certain balance is already included in it against possible deficits in following years. The balance is also desirable for those cases in which the special reserve fund actually consists of shares, because it allows of covering temporary small debit balances without the necessity of drawing upon the funds and, in such event, of realizing on the shares at a loss. With regard to the creation of a reserve fund it must be noted that accountancy established on a sound basis requires that a reserve should be made during the good years so as to provide means for covering deficits that may occur at periods of commercial depression and consequently the falling off of traffic. The experience of the last few years has moreover thoroughly shown the need for the creation of a large reserve fund.

The Bill contains no provision as to the total of the reserve fund, for it appears unnecessary under present circumstances to fix any legal limit. The provision in the 4th paragraph, moreover, prevents the reserve fund from becoming too great in a given length of time, because, according to this provision, appropriate measures must be taken to modify the conditions of transport, when the excess of the profit and loss account exceeds, for five consecutive years, 8 % of the receipts of working for each year.

V. — Conditions of engagement and service of the Staff.

Art. 30. — The conditions of engagement and service of the staff having, by the new Act relating to salaries, to be determined in a uniform manner for the whole of the Federal Administration, this article is confined to framing a general provision following which the present requirements will hold until a new law comes into force. It may also be noted that the commisson of the staff, as well as the sections of the staff of the General Direction and of the District Directions will have to be maintained under the regulations of the new organization. The results obtained up to the present have given complete satisfaction.

Economies.

Detailed calculations have been made to obtain a figure for the economies that may be effected by the introduction of the proposed reform. The number of the employees will be reduced by 405 and the economy effected will amount to 5 100 000 fr. per annum. The diminution in the total of the staff will arise mainly from the reduction in the number of districts, of the District Directors and of their secretarial staffs, as well as from the fusion of the financial departments and the general simplification of the business arrangements. The annual

economy of 5 100 000 fr. is made up as follows : reduction of expenses for the staff 4 420 000 fr.; reduction in the number of members of the Administrative Councils 30 000 fr., and reduction in interest and in the expenses of the stores, of the workshops, and of the finance departments 650 000 fr.

If the five existing Districts were maintained, the total staff would only be reduced by 210 officials and the annual expense by 3 100 000 fr. only. The advantage of the reduction of the number of departments does not only rest, as has been seen, in the economies which it will be possible to effect, but also in the simplifying of the Administration.

It is true that the economies which are here in question will not be immediately realized, because the reduction in the total staff can only be brought about gradually. The question is, however, one involving such large sums that it cannot be shelved if any serious effort is to be made to introduce economy in the Administration.

Conclusions.

The Bill which is being introduced is based upon the experience of nearly twenty years, on an elaborate study and on the judgment of a Commission of competent experts. It appears to represent the form of State Railway Administration most suited to the country, to its political and economical conditions, and to the needs of the Administration itself. The various features that are introduced have been very carefully adapted to each other and their reciprocal relations soundly established in such manner that it is not possible to modify any detail without making some alteration in the others.

But the drafting of a new Bill and of a new order for putting this into force is not of itself sufficient. It is further necessary to have from the top of the scale to the bottom the good will of all in order to transform the somewhat sluggish organism into a lively agent capable of effecting progress towards national economy.

The present Bill should contribute to the birth of this new spirit.

The Swiss people understand that we are at last passing from the period of preparation to that of action.

B. — Federal Bill

regulating the organization and Administration of the Swiss Federal Railways.

FEDERAL ASSEMBLY
OF THE
SWISS CONFEDERATION.

With the object of simplifying the Administration of the Federal Railways and making their working more economical;

Having regard to the Reference from the Federal Council dated 1921;

And having regard to Article 26 of the Federal Constitution ;

It is decreed :

Articles 5, 7, 7*bis*, 8, 10 to 39, and 48 of the Federal Act, dated 15 October 1897, relating to the purchase and working of the railways to the account of the Confederation, as well as the organization of the Administration of the Federal Railways, are now amended by the following provisions.

I. — General provisions.

Art. 1. — [1]The Confederation shall administer and work the railways purchased or constructed by it under the name of « The Federal Railways » (Chemins de fer fédéraux) according to business principles while safeguarding the interests of national economy.

[2]The business and working shall be in the hands of a Federal Administration, autonomous within the limits fixed by the present law. As complete an independence as possible will be given to the different services of this Administration with a view to ensuring the simple and rapid execution of business.

Art. 2. — [1]The Administration of the Federal Railways shall have its legal headquarters at the offices of the General Direction.

[2]It shall, moreover, be required to select an official address in the chief town of each canton, at which an action at law can lie at the instance of the inhabitants of that canton.

[3]Suits relating to real property shall be brought before the Court within whose jurisdiction the property lies.

[4]The provisions of Article 48, Chapter 2 of the Federal law of 22 March 1893 and 6 October 1911 on the organization of the Federal courts shall not be applicable to cases brought against the Federal Railways.

Art. 3. — [1]The Federal Railways shall be exempt from any cantonal or communal tax. This provision shall not apply to land and buildings belonging to the Federal Railways which are not essential to their working.

[2]The requirements of the cantons relating to insurance shall not apply to the Federal Railways, in so far as the rolling stock, plant, equipment and goods in transit are concerned.

Art. 4. — [1]The general laws of the Confederation relating to railways shall be equally applicable to the Federal Railways in so far as the conditions apply, unless special exception has been made.

[2]The requirements relating to the superintendence and control of railways and navigation undertakings by the (Swiss) Confederation do not apply to the Federal Railways.

II. — Powers of the Federal Assembly and of the Federal Council.

Art. 5. — Apart from its legislative jurisdiction the Federal Assembly shall have the following powers :

1° The approval of the estimates;

2° The approval of the annual accounts and the report;

3° The authorization of the Federal Council to raise loans for the requirements of the Federal Railways.

Art. 6. — The Federal Council shall exercise the ultimate supervision over the management and shall fix in its main outline the general policy to be followed with regard to the railways. It shall be authorized to give such instructions to the Administration of the Federal Railways, in the interests of the country, as it may think fit. It shall have moreover the following powers :

1° It shall represent the Administration of the Federal Railways in the Federal Assembly;

2° It shall appoint :

a) The President, the Vice-President and the Members of the Administrative Council;

b) The President of the General Direction, the Head Managers and the District Managers;

c) Six Members on each of the Railway Councils.

3° It shall issue the loans and fix the conditions of issue;

4° It shall approve :

a) General schemes for the construction of new lines;

b) Designs for new works, for alterations and for completion of works in progress, for which the estimated cost exceeds three million francs;

c) Designs for other work, including schemes for the electric installations of other undertakings affecting the Federal

Railways, when the latter fail to come to an agreement with the Federal or Cantonal authorities after appeal for their opinion, or with interested third parties;

d) Time-tables;

e) Contracts for leasing or working railways;

f) Regulations for the insurance of the staff;

g) The control of the renewals fund.

III. — Administrative Bodies.

Art. 7. — The administrative bodies of the Federal Railways shall be as follows:

1° The Administrative Council;
2° The « Direction »;
3° The Railway Councils.

1. — The Administrative Council.

Art. 8. — [1]The Administrative Council shall consist of the President, the Vice-President and nine Members appointed by the Federal Council.

[2]Each of the Railway Councils must be represented by a Member on the Administrative Council.

[3]The Administrative Council shall be appointed for three years.

Art. 9. — The Administrative Council shall have the following powers:

1° It shall supervise the whole of the Administration;

2° It shall give its preliminary opinion on all important matters relating to the Federal Railways which require to be decided either by the Federal Council or by the Federal Assembly;

3° It shall prepare the estimates, examine the annual accounts and report, and transmit these to the Federal Council;

4° It shall decide the general organization of the Administration and the principles on which the benefit societies for the staff are based;

5° It shall settle the general schemes for new works, for alterations and for completion of works within certain financial limits;

6° It shall ratify important contracts;

7° It shall make nominations to the Federal Council for the appointment of the President of the General Direction, for Head Managers, and for District Managers, and it shall appoint the divisional chiefs of the General Direction.

[2]The order for putting this act into force will define in greater detail the duties and jurisdiction of the Administrative Council.

Art. 10. — [1]The Head Managers and the District Managers shall attend the meetings of the Administrative Council. They shall have the right to vote on matters on which they are consulted and have the right to make recommendations.

[2]The President and the members of the Administrative Council shall receive allowances the amount of which shall be decided by the Federal Council.

2. — Direction (General Management).

Art. 11. — The Direction shall include a General Direction of Board and District Directions of Boards.

a) General Direction.

Art. 12. — [1]The General Direction shall consist of a President and two General Directors appointed by the Federal Council on the nomination of the Administrative Council; the Federal Council is not bound by this nomination.

[2]The period for which the President and the General Directors shall be appointed is six years.

[3]The General Direction shall have its headquarters in Berne.

Art. 13. — [1]The General Direction shall be responsible for the higher administration and working of the railways except in so far as these fall

within the jurisdiction of the Administrative Council and the duties allotted by the present Act to the District Directions.

[2]It shall appoint its staff, except that provided for under Article 9, sub-head 7 and the departmental heads of service under the District Directors.

[3]Decisions on matters of importance shall be given by the General Direction. The preparation of these matters, the liquidation of others of less importance, as well as the direction and superintendence of the various services shall be assigned departmentally to the President and the Directors General.

Art. 14. — [1]The President of the General Direction shall represent the Administration of the Federal Railways in relation to third parties, in so far as this may appear to him to be justified by the nature of the business.

[2]He shall direct the Presidential department and supervise the working of the Administration. He shall be authorized to intervene in the working of other departments and of the District Directions, as well as to give his instructions direct if he should think it necessary.

Art. 15. — The necessary sections for the direction of services immediately assigned to the President and the Directors General shall be established at the headquarters of the General Direction; some services may, with the authorization of the Federal Council, be transferred elsewhere.

Art. 16. — [1]At the head of each section there shall be a head of section appointed by the Administrative Council.

[2]The heads of sections shall direct the affairs of their own sections according to the requirements of the organization of the service and to the annual estimates. Within the limits of their powers they shall give the necessary instructions to the district divisions and supervise the carrying out of these.

[3]The heads of sections must make verbal reports, and in important cases written reports, to the head of the department to which they belong on the general procedure of business, and make any necessary recommendations.

b) District Directions or Boards.

Art. 17. — [1]The Federal Railway system shall be divided, for management and working, into three Districts.

[2]The Federal Council shall define the Districts on the recommendation of the Administrative Council.

[3]The boundaries of Districts must not exercise any influence on the engagement of the staff and on the use of the installations and rolling stock necessary for the working.

Art. 18. — [1]A District Direction shall be formed for each District.

[2]These Directions shall have their place of meeting at Lausanne, Lucerne and Zurich.

Art. 19. — The District Directions shall have the following powers;

1° They shall represent the C. F. F. (Federal Railways) in administrative and legal affairs and in all matters arising out of them;

2° They shall direct the following branches of the service within the boundaries of their District, in accordance with the regulations in force and the instructions given to them :

a) Management of the funded property;
b) Accounts and cashier's office;
c) Maintenance and superintendence of the permanent way;
d) Working of stations and trains;
e) Motive power;
f) Working of navigation and of harbours;
g) Administration of stores;
h) Organization of road transport;

3° They shall arrange for the terms of service, appointment, removal from place to place, for the discharge and the retirement of officials, employees and workmen of the District Direction, with the exception of the heads of sections, and they shall fix the salaries and wages of the staff;

4° They shall supply the public with information as to tariffs or fares, co-operate in efforts for attracting traffic and report to the General Direction on the commercial situation;

5° They shall decide on questions of compensation occasioned by death or disablement and settle questions of compulsory insurance against accidents which fall within their sphere of activity;

6° They shall decide on claims bearing on the internal working of the Federal Railways, on incorrect rates and on mistakes of route, on loss and damage of articles carried as well as on delays in the transport of passengers or goods, so far as this duty is not assigned to the stationmasters or heads of goods stations;

7° They shall adopt schemes for new works, alterations and completions and provide for carrying them out to the extent provided by the order for putting the present Act into force;

8° They shall deal, moreover, with matters which are referred to them by the order for putting the Act into force, by the decision of the Administrative Council, or by the General Direction.

Art. 20. — [1]At the head of each District Direction there shall be a District Director (or Manager), elected by the Federal Council on the recommendation of the Administrative Council; the Federal council shall not be bound by this recommendation.

[2]District Directors or Managers shall be elected for a period of six years.

[3]District Directors shall be directly under the General Direction of whom they are the representatives in the Districts. Alone, or in conjunction with the sections under them, they shall carry out the powers and duties conferred on the District Directions according to Article 19 of the existing Act and supervise the putting into force of the instructions of the General Direction. They shall devote their attention particularly to matters relating to the staff and in order to keep the General Direction informed they shall take steps to obtain accurate information relating to the traffic in their District, according to the needs of commerce, industry, agriculture, trades, etc. and shall give the necessary orders for the regular carrying out of business and working of their District.

Art. 21. — [1]A head of section, appointed by the General Direction, shall be placed at the head of each of the sections under the District Directors.

[2]The heads of sections of the District Direction shall direct the affairs of their section, within the limits of the organization of the service and the annual budget. They shall be in direct communication with the heads of sections of the General Direction.

[3]The heads of sections must make verbal reports, and in important cases written reports, to the District Direction on the progress of business.

3. — Railway Councils.

[1]A Railway Council shall be constituted for each District.

[2]These Councils shall consist of from twenty to twenty-five members of whom six shall be appointed by the Federal Council and the others by the cantons and demi-cantons.

[3]The order for putting the Act into force shall decide the distribution of offices for the cantons. Each canton or demi-canton situated within the area of a District should have at least one re-

presentative. The other offices shall be distributed according to the length and commercial and economical importance of the district lines affecting the area of the cantons concerned.

[4]The Federal Council in making its appointments shall take care that agriculture, trades, industry and commerce as well as the staff shall be represented on each Railway Council.

[5]The term of office of Members of the Railway Councils shall be three years and shall coincide with that of the Administrative Council.

Art. 23. — The Railway Councils shall have the following powers :

1° They shall elect their President and their Vice-President selected from among their Members for the duration of the Administrative period;

2° They shall confer and give their opinions to the competent authorities on general questions of construction, working and of a commercial or financial nature when these are required by the Federal Council, by a cantonal government, by the Administrative Council, by the General Direction, by the District Director, or by one of their Members;

3° They shall pass the draft estimates for the annual expenditure drawn up by the District Direction for submission to the General Direction.

Art. 24. — [1]The Railway Councils shall meet when called by their President, when required by the business, or in response to a demand from one fourth of the membership. The District Directors shall take part in the meetings and have advisory powers.

[2]The three Railway Councils shall meet, moreover, once or twice a year in common session, convoked and presided over by the head of the Department of Federal Railways to discuss questions of a general nature concerning the Federal Railways and also to put forward their desires and suggestions.

[3]The members of the Administration Council, the General Directors and the District Directors shall also take part in these common sessions of the Railway Council.

Art. 25. — The Members of the Railway Councils shall receive attendance vouchers and allowance for travelling expenses according to the rates fixed by the commissions of the Federal Chambers.

IV. — Accountancy of the Federal Railways.

Art. 26. — [1]The accountancy of the Federal Railways shall be separate from that of the other branches of the Federal Administration. It shall be so arranged that the exact financial position can be ascertained at any time.

[2]The department dealing with the interest and amortization of the railway debts shall be paid by the Federal Railways.

Art. 27. — [1]The capital invested in the Federal Railways, with the exception of 70 per cent of the value of the rolling stock and of the plant, must be written off within a period of a hundred years dating from 1903, or, in the case of lines purchased at a later date, from the date at which they were nationalized.

[2]New expenditure, carried each year to the construction account, shall also be written off in the period of a hundred years.

Art. 28. — [1]A renewals fund shall be formed for constructional works and installations on those lines of the Federal Railways that are subject to heavy wear.

[2]The renewals fund shall not be credited with interest. Its total will be carried to the debit side of the balance sheet.

Art. 29. — [1]This excess of receipts of the Federal Railways shall be carried in the first instance to the credit of the interest and amortization account of the

capital invested and against future possible deficits.

[2]If the profit and loss account, including the sum brought forward from the preceding year, shows a credit balance, this shall be carried forward to the new account, until it amounts to 5 % of the total amount of the receipts from working for the year. The possible excess shall then be carried to the reserve fund. No interest shall be allowed to be placed to the credit of this fund.

[3]The reserve fund shall serve to cover extraordinary expenses, as well as any deficits which the profit and loss account may show.

[4]When the excess of the profit and loss account, after deduction of the sum carried forward from the previous account, exceeds, for five consecutive years, 8 % of the receipts for the working year, measures must be taken to reduce the cost of transport.

[5]The order for putting the Act into force, shall fix the rules in regard to the excess on the profit and loss account for the accountancy of the Federal Railways.

V. — Regulations for the engaging and service of the Staff.

Art. 30. — [1]The general conditions of engagement and working of the staff as well as the wages and insurance of the employees of the Federal Railways shall be regulated by the legal provisions dealing with this matter.

[2]The Federal Council shall decide the provisions relating to special conditions of services, to facilities for transport, to the constitution of committees of the staff and other analogous questions. It may delegate this power to the Administrative Council or to the General Direction.

Art. 31. — The Directors General, the District Directors and the heads of sections shall be retired in the course of the year in which they attain the age of sixty-five.

VI. — Temporary and final provisions.

Art. 32. — The Federal Council shall be empowered to put the present Act into force and shall fix the date at which it comes into operation.

C. — Draft of the order for putting the Act into force.

The Swiss Federal Council :

In execution of the Federal Act dated . . . . . regulating the organization and administration of the Federal Railways

hereby orders :

I. — The higher supervision of the Federal Council.

Art. 1. — [1]The higher supervision of the management and administration of the Federal Railways assigned to the Federal Council shall be exercised by the Department of Railways.

[1]All matters concerning the Federal Railways of which the examination or the decision is within the province of the Federal Assembly or of the Federal Council shall be submitted to the Department of Railways which will lay its proposals before the Federal Council.

[3]The President of the General Direction and the Directors General shall be immediately responsible for reporting when required to the head of the Department of Railways, for giving him their opinion, and for furnishing particulars on all matters concerning the Federal Railways. The President of the General Direction shall keep the Chief of the Railway Department constantly in touch with the progress of the undertaking

and with all important facts which may arise in its Administration.

4The minutes of proceedings of the sittings of the Administrative Council, of the General Direction, and of the Railway Councils shall be communicated to the Railway Department for its own use and for the information of the Federal Council.

Art. 2. — The Railway Department is moreover entrusted, in accordance with Article 23 of the Federal Act dated 26 March 1914 relating to the organization of the Federal Administration, to deal immediately with the following matters coming within the powers of the Federal Council by virtue of Article 6 of the Federal Act of.....

1° It shall make rules for the carrying out of the higher supervision of the Federal Council and specify the schemes, reports and data which the Administration of the Federal Railways must supply it with;

2° It shall determine the principles regulating the relations between the Administration of the Federal Railways and that of the Post, Telegraphs and Telephones;

3° It shall give to the Administration such instructions as may appear necessary in the interest of the Country;

4° It shall give decisions on appeal relating to disputes concerning the technical or business relationship of the railways with navigation undertakings, or of private sidings connected to the tracks of the Federal Railway System as well as differences relating to schemes for works affecting railway stations, or common sections, through or over which the Federal Railways have running powers;

5° It shall approve :

a) The general designs for the construction of new lines;

b) The designs for new works, for alterations and for completions;

c) The time-tables;

d) Contracts for leasing and working the railways;

e) The articles and actuarial bases for the insurance of the staff;

f) The regulation of the renewal fund.

II. — Administrative Bodies.

1. — Administrative Council.

Art. 3. — The Administrative Council shall have the following powers :

1° It shall supervise the whole of the Administration;

2° It shall advise upon all important matters relating to the Federal Railways which should be dealt with by the Federal Council or the Federal Assembly. The matters particularly concern :

a) The preparation or revision of acts, by-laws and regulations relating to the Federal Railways;

b) Proposals relating to construction of new lines or the purchase of existing lines on account of the Confederation;

c) The rules upon which the rates are to be based;

d) Contracts for the lease and the working of the railways;

e) Regulations relating to the renewal fund.

3° It shall determine the draft estimates and examine the annual accounts as well as the report on the working of the Federal Railways;

4° It shall determine the general organization of the Administration and the principles on which the provident institutions for the staff are based. This power shall include :

a) The preparation of a regulation governing the working of the Administrative Council;

b) The approval of the regulations of the General Direction and of the District Directions;

c) The approval of the regulations for

the divisions of the General Direction as well as of the sections of the General Direction and of the District Directions;

d) The preparation of regulations relating to the salaries and wages of the staff within the statutary limits relating to salaries, the preparation of regulations to supplementary grants and to uniforms, as well as the allowance for travelling on railway service and for removal;

e) The preparation of rules for the insurance of the staff;

f) The preparation of regulations relating to passes and the issue of tickets at reduced rates (privilege tickets) within the limits settled by the existing ordinance;

g) The establishment of principles and general conditions for the financial assistance of the Administration towards the social schemes that may be proposed or formed by the staff;

5° It shall decide on general schemes for new work, for alterations and completions the estimates for which exceed one million francs and shall grant credits for their execution; furthermore it may make supplementary grants for these works when it is foreseen that the original credit will be exceeded by over 25 %;

6° It shall confirm the following agreements and contracts :

a) Contracts relating to the continuation or agreeing to subsidiary undertakings;

b) Agreements with other transport undertakings with the object of arranging reciprocal relationship and conditions of competition for the traffic of passengers, luggage, live stock and goods;

c) Contracts for construction and supply the total of which exceeds one million francs;

d) Contracts for acquiring large water-power installations and the grant of important sub-concessions;

e) The purchase of buildings for future requirements and the sale of buildings when the cost of purchase or of sale exceeds 500 000 fr.;

7° It shall nominate to the Federal Council for appointment the President of the General Direction, the General Directors and the District Directors and it shall appoint the heads of sections of the General Direction.

Art. 4. — [1]The Administrative Council shall meet, when summoned by its President, when the state of business so requires or at the request of at least one-third of its members.

[2]As a general rule the sittings shall be held in Berne. They shall not be open to the public.

[3]The quorum of the Council shall be a majority of its Members.

2. — Direction.

a) General Direction.

Art. 5. — [1]The following divisions are hereby constituted for the division of the business of the General Direction between the President and the General Directors :

a) President;
b) Works and traffic;
c) Claims and tariffs.

[2]The distribution of the divisions among the Directors shall be decided by the Federal Council.

Art. 6. — The *division of the President* shall have the following powers :

1° Advice on questions of railway policy and of a general nature regarding railways and the working of the Federal Railways;

2° Finance, supervision of the income and of the expenditure;

3° Accountancy, book-keeping, cashier's office, and the register of shares;

4° Drafting the estimates for the cost of working and the annual balance sheet;

5° Examination and checking of guarantees furnished to the Administration;

6° Financial assistance from the Administration towards industrial enterprises;

7° Allocation of subscriptions and voluntary assistance;

8° Questions relating to the staff, in particular regulations of the general conditions of service, general instructions with a view to ensuring uniformity in the wages of the staff, its promotion, its holidays and its discipline; advice regarding petitions and requests that may be brought forward;

9° Assistance from the Administration to social institutions proposed or formed by the staff, such as for the construction of dwelling-houses;

10° Administrative measures tending to facilitate the recruiting of staff possessing a sufficient preparatory training for the various services of the railway and encouraging the scientific and professional development of the officials of the higher branches of the service;

11° Insurance of the staff;

12° Medical service.

Art. 7. — The department of works and traffic has the following powers :

1° Constructive works, including the installation of electric traction;

2° Maintenance and superintendence of the track;

3° Station and train service;

4° Motive power staff;

5° Rules relating to the use of the rolling stock, the central control of rolling stock and the repayment of penalties for detention of wagons;

6° The joint use of stations, yards, sections of track, siding lay-outs and also of electric-power stations;

7° The leasing and letting of railway lines;

8° The leasing of the right of working private undertakings within the stations and yards, and in particular the leasing of buffets; refreshment-rooms;

9° Regulations for contracts relating to private sidings as well as the establishment of carting services;

10° Workshops and electric-power stations;

11° Purchase and sale of rolling stock;

12° Purchase and supply of electric power.

Art. 8. — The department for claims and tariffs has the following powers :

1° The representation of the Administration in legal matters, advice on questions of law, and participation in the concluding of all important contracts;

2° Acquiring concessions for hydraulic power and the granting of sub-concessions;

3° Purchase, sale and leasing or letting of buildings, so far as this power does not fall within that of the District Directions;

4° Insurance of equipment and buildings;

5° The settlement of cases of civil responsibility due to death or injury to persons, so far as this power does not fall within the province of the District Directions;

6° The settlement of claims for damages and claims relating to luggage, live-stock, and goods traffic;

7° Rates and publicity;

8° Regulations for transport, agreements relating to transport, and agreements with similar undertakings settling the relations for competition in respect to the transport of passengers, luggage, live-stock and goods;

9° Contracts with touring agencies;

10° The commercial organization of warehouse administrations;

11° The checking of traffic and of statistics;

12° Treasurer's office.

Art. 9. — The regulation of the General Direction, approved by the Administrative Council, shall determine those matters which must be submitted by the departments for the decision of the General Direction.

Art. 10. — [1]The General Direction shall hold two ordinary meetings each week; it shall also hold special meetings when required.

[2]The General Direction shall only take an effective decision when at least two of its Members are present.

[3]The decisions shall be taken on the majority of votes. When two Members alone are present the decisions and appointments shall not be effective unless the votes are in agreement.

Art. 11. — The services immediately depending on the President of the General Direction and on the Directors General shall be distributed among the following sections :

a) *Under the department of the President :*

1° General Secretary;
2° Cashier and Accountant;
3° Chief Accountant and Registrar;
4° Medical service;
5° Staff matters.

b) *Under the department of works and traffic :*

1° Permanent ways;
2° Electrification;
3° Stations and train service;
4° Motive-power and workshops.

c) *Under the department for the settlement of claims and tariffs :*

1° Claims;
2° Tariff and publicity;
3° Checking of traffic and Statistics;
4° Treasurer's office.

Art. 12. — The General Direction may, with the authority of the Administrative Council, modify the distribution of the services and of the divisions among the departments and in that case, decide upon the departments to which the new services shall be attached.

Art. 13. — [1]Each division shall be supervised by a divisional chief who shall be directly responsible to the head of the department.

[2]Each divisional chief shall have allotted to him one or more assistants according to the number and importance of the matters dealt with, and also heads of section responsible for the management and superintendence of certain special services.

[3]The total number of officials in each division shall be fixed by the organization determined by the Administrative Council and by the estimates.

Art. 14. — [1]The divisional chiefs have the right to demand, at any time, from the district divisions all particulars relating to the business coming under their charge, or to proceed direct with enquiries into such business. They are also authorized to call meetings of representatives of these divisions to discuss service questions.

[2]The divisional chiefs shall sign, in the name of their division, the correspondence which issues from their office as well as the decisions which they make.

Art. 15. — [1]The organization of the service determined by the Administrative Council defines the powers of the divisions and the business matters which they are entitled to settle without reference.

[2]This organization shall fix the jurisdiction in such manner as to relieve the President of the General Direction and the Direction General of all matters of secondary importance and to confer on the various branches of the service as great a degree of independence as possible in order to ensure simple and rapid working.

b) District Directions.

Art. 16. — The first District shall include the following lines :

(to be settled later).

Art. 17. — The second District shall include the following lines :

(to be settled later).

Art. 18. — The third District shall include the following lines :

(to be settled later).

Art. 19. — Each District shall include the lines belonging to other undertakings situated within its area and worked by the Federal Railways.

Art. 20. — [1]The General Direction makes the necessary arrangements for unity of working of the Federal Railways. The drawing-up, and putting into force of the time-table, the use of the locomotives and of the rolling stock, the movements of the locomotive staff and of the trains, as well as the use of installations accessory to the working, must be regulated, without regard to the division among the Districts of the yards, stations, lines and institutions for the well-being of the staff.

[2]The division of the Federal Railway system into Districts must in no way form an obstacle to the transfer of employees who may desire to learn another national language.

Art. 21. — [1]The District Directions shall draw up the schemes for new work, alterations and completions to be carried out within their several Districts and shall submit them to the General Direction for approval and allottment of credits unless the General Direction expressly forgoes this power.

[2]The District Directions shall examine the schemes for new works, for alterations and for completions, with the Federal and cantonal authorities, in accordance with the regulations as to the procedure to be followed for the approval of the plans, and shall supervise the execution of these works.

[3]When the estimates for new works settled by the District Directions, have been examined, the General Direction shall decide upon the said works, alterations, etc., which the District Directions may execute without submitting in advance the projects for its approval and asking for a special-credit to be opened. As a general rule it shall grant this power to District Directions for all schemes, the execution of which will not cost more than 100 000 fr.

[4]The General Direction may in exceptional circumstances reserve to itself the preparation of schemes and the carrying out of important new works, alterations or completions of special nature or magnitude.

Art. 22. — The powers to the District Directions shall also include :

1° Acquiring buildings and rights to construct works, the execution of which is entrusted to the District Directions;

2° The granting of contracts for construction and supply; these contracts must however be submitted for ratification by the General Direction when they deal with sums exceeding 200 000 fr.

Art. 23. — [1]The following divisions are subordinate to the District Director :

1° Administration;
2° Works;
3° Traffic.

[2]Regulations made by the District Direction, approved by the Administrative Council shall determine the duties and powers of the sections in such manner that the District Director shall be relieved of all matters of a secondary importance and confer on the several branches of the service as large a degree of independence as possible, in order to ensure simple and rapid working.

Art. 24. — [1]The Director shall exercise

the powers conferred on the District Direction by Article 19 of the Federal Act of . . . . and Articles 20 and 21 of the present statute, in so far as they are not delegated to the chiefs of sections of the District Direction by the present regulations.

[2]The District Director shall not give decisions on the following matters, until he has consulted the heads of sections or their assistants :

1° Appointment, discharge and retirement of officials and employees of the District with the exception of the heads of sections;

2° Settling the salaries of officials and employees appointed by the District within the limits of the Act relating to salaries and the instructions of the General Direction;

3° Granting of contracts for construction and supply, the amount of which does not exceed 50 000 fr.;

4° The imposition of the following disciplinary penalties on the officials, employees and workmen of the district :

a) Fines of more than 50 fr. and a share of losses exceeding this limit;

b) Withdrawal of special travelling facilities;

c) Suspension from work for more than one month;

d) Removal to another district as a disciplinary measure :

aa) To a similar position in another place, either at the same or at lower remuneration;

bb) To a different position, either at the same or lower remuneration.

5° Reduction or suppression of rise of salary by seniority.

[3]The decisions of the Director, taken in virtue of paragraph 2, shall be recorded in a minute and communicated to the General Direction.

Art. 25. — [1]The General Direction shall call, at least once a month, the District Directors to a conference in order that they may communicate their views to them, give them instructions, obtain information on the progress of business in the Districts and discuss important questions with them.

[2]The instructions shall be given to the District Directors either by the General Direction as a supreme authority or by the heads of departments.

[3]The General Direction shall appoint, for the duration of the administrative period of three years, one of the chiefs of division of each District Direction as deputy for the Director.

Art. 26. — [1]The divisional chiefs shall make verbal report to the District Director on the matters of importance which arise in their division and within their province.

[2]They shall sign in the name of their division correspondence which issues from their office and the decisions which they take.

3. — Railway Councils.

Art. 27. — [1]The number of Members of the Railway Councils is fixed at 24 for each District.

[2]The Federal Council shall nominate six Members for each Council.

[3]The other Members shall be nominated by the cantons in the following proportions :

1st *District :* Geneva ...., Vaud ...., Valais ...., Fribourg ...., Neuchâtel ...., Berne ...., Soleure ...., Bâle-rural ...., Bâle-town ....;

2nd *District:* Berne ...., Soleure ...., Bâle-town ...., Bâle-rural ...., Argovie ...., Lucerne ...., Unterwald-le-Bas ..., Unterwald-le-Haut ...., Uri ...., Schwyz ..., Tessin ...., Zug ...., Zurich ....;

3rd *District:* Bâle-town ...., Bâle-rural ..., Argovia ...., Zurich ...., Schaffhausen ...., Saint-Gall ...., Glaris ...., Schwyz ...., Thurgovia ...., Appenzell-Rhodes extérieures...,

Appenzell - Rhodes intérieures ...., Grisons ....

Art. 28. — The Federal Council shall draw up the procedure for the guidance of the Railway Councils.

III. — The Accounts of the Federal Railways.

Art. 29. — [1]The accounts and the balance sheet of the Federal Railways must be drawn up in accordance with the uniform scheme of accountancy obligatory on all the Swiss Railway undertakings.

[2]There shall be no distribution of the receipts and expenses according to Districts.

Art. 30. — [1]The account for the construction of the Federal Railways shall be debited with :

a) The expenditure on new works and on completions which result in an increase or appreciable improvement in the works or installations of the Federal Railways;

b) The cost of organization and administration as well as the interest on expenditure for construction occasioned by the establishment of the works and installations during the period of construction and up to the moment of their being put into service;

c) The expenses of ballasting and keeping in order new lines during the first six months of working, that is, so far as they exceed the normal cost of maintenance;

d) Expenditure incurred in keeping in order new electric contact lines and in making practical tests of electric traction during the first three months of running, that is, so far as these exceed the normal expenditure on maintenance and running.

[2]The rate of interest on the expenses of construction must not exceed that on the capital allowed for the construction.

[3]The inclusion of profits in the charges for supplying material or for labour connected with the construction of the Federal Railways own lines is forbidden.

[4]Transport effected by the Federal Railways on their lines for the purpose of their own works is only debited at the net cost in the construction account.

[5]The Administration is authorized to carry to the working account, in those cases in which it does not exceed 50 000 fr., the expenses which may be carried to the account of the cost of construction in accordance with paragraphs 1 to 4 of this Article.

Art. 31. — [1]Credit must be given in the construction account for all works and installations put out of use or demolished.

[2]If new works or installations replace those that have been demolished the value shall be posted to the construction account.

Art. 32. — The following shall not be posted tot the construction account :

1° The cost of loans or other analogous operations and loss on the exchange;

2° Contributions made to other railway undertakings or for works situated outside the province of the Federal Railways or which remain the property of a third party;

3° The cost of works and installations of the Federal Railways established with the assistance of contributions from third parties;

4° The expenses incurred in the organization and establishment of the working of new lines.

Art. 33. — The Administration of the Federal Railways is hereby authorized to create and maintain, apart from the renewal fund, other funds intended to cover certain special risks. The Administrative Council shall decide all particulars of detail on this subject.

Art. 34. — [1]The interest on the debt, the payments to the renewals fund and to any other funds created by the Administration, as well as those sums allotted for the amortization of the capital for establishing the line, the works and installations demolished, the cost of loans, etc., shall be carried each year to the expenditure side of the profit and loss account, even though the receipts of working are not sufficient to cover them.

[2]The Administration is authorized to debit the expenditure account, by writing off the inventory value of important structures that have been demolished.

Art. 35. — [1]The annual estimates shall provide for the receipts and expenditure of the Federal Railways. The Administrative Council shall remit the scheme to the Federal Council before the end of October of the preceding year in order that it may be submitted to the Federal Assembly.

[2]The annual accounts of the Federal Railways and the report on the working shall be sent by the Administrative Council to the Federal Council at the latest on the 15 May in the following year to be laid before the Federal Assembly.

IV. — Conditions of appointment and service of the staff.

Art. 36. — [1]Up to the time when articles 40 to 47 of the Federal Act of 15 October 1897, concerning the acquiring and working of the railways by Confederation, as well as the organization of the Administration of the Federal Railways. are replaced by new legal provisions, the Administrative Council will regulate within limits of the above quoted Articles the conditions of appointment and service of the staff and disciplinary powers.

[2]A special service will be created attached to the General Direction and to each District for questions relating to the staff.

V. — Special travelling facilities.

Arts. 37 to 41. — (Arts. 67 to 70 of the existing regulation for putting the Act into force without modification.)

VI. — Temporary and final provisions.

Art. 42.— The present order will come into force on 1 January.... It will replace the regulation for putting into force the Act dated 7 November 1899 and its supplementary clauses.

This is the scheme of the Department of Railways approved by the Federal Council.

The scheme will now be subjected to the examination of the consultative committees of the two Houses and the latter will then be required to make a pronouncement on its acceptance or rejection. In the first case the *referendum* may still be demanded. We do not doubt that the head of the Department, Federal Councillor Haab, with his characteristic energy, will be able to overcome all dificulties and objections in such manner that the Act will be passed in the best interests of the Country and the prosperity of its great national undertaking.

[385 .3 (.460) & 385 .1 (.460)]

Proposed legislation regarding the administration of the Spanish railways,

By Pierre LESEUR,
MINING ENGINEER, DOCTOR OF LAW.

(*Revue politique et parlementaire.*)

At the moment when the Senate is about to discuss the bill adopted by the Chamber of Deputies on the 18 December 1920, relating to the new organization of railways of general interest, it appears to us opportune to refer to the bill which the Minister of Public Works, M. La Cierva, has recently laid before the Spanish Cortes, and which also is on the question of railway reform (1). In Spain, as in France, the reorganization of the railways is imperative if the economic conditions of life are to revert to their normal course.

At present Spain is passing through a profound economic crisis. Bilbao, the important centre of the ore market, has seen its mineral ore exports fall from 241 000 t. in March 1920, to 34 000 t. during the corresponding period this year (2). The stocks of ore which have accumulated in this port already amount to a million tons, in spite of the stoppage of a number of mines. England, who was the principal buyer, reduced her purchases because of the miners' strike. Even supposing that the situation of our ally once more becomes normal, the crisis at Bilbao will not be greatly alleviated. The export trade statistics show, in fact, that since the armistice the export figure has declined continuously, whereas imports have increased. In the first two months of this year the value of the latter was 278.75 million pesetas, as compared with 182.48 during the corresponding period in 1920, and 120.34 in 1919. The figures for exports were 217.77 in 1919, 150.62 in 1920, and 125.51 in 1921. It may be said that Spain is the victim of a too rapid increase of wealth during the war and the depreciation of foreign money which has resulted therefrom (1).

It is natural that the public authorities should be troubled by this situation and that they should study the best means of remedying it. The preamble of the new bill, in a striking summary, sets out the difficulties of the situation :

« Spain is suffering to-day from an acute economic crisis. A large proportion of the mines are closed down. The coal and lead mines are obliged to diminish their production. The railway service is inadequate to the needs of the country. Its reorganization would require an enormous amount of mo-

(1) *Gaceta* of Madrid, 14 May 1921.

(2) See the financial journal *Economista* of 30 April 1921.

(1) It is interesting to note in this connection that a ton of commercial iron bought in France cost in Spain, at the beginning of the year, 530 pesetas, all charges and duties included, whereas the Spanish metallurgical works sold it at 760 pesetas. The exchange value of the franc at Madrid was then about 50.

ney, and even at this cost Spain would only possess half the lines which she requires. The immense sacrifices made by the State for the construction of roads are in danger of remaining unfruitful because repairs are indefinitely delayed. The towns ask in vain for the construction of hydraulic works which will facilitate irrigation and give productivity to regions which, in spite of their extent, are unable to feed the country because of their dryness. The ports urgently require improvements and extensions to fit them to cope with traffic and to bring prosperity to the regions which they serve. »

In conclusion, the bill appeals for universal union and concord. It insists on the necessity of its becoming law, notwithstanding the enormous sacrifices which it will impose on the country :

« At the present moment we have to declare that if we do not decide to take this course, we shall never obtain the economic development which is the basis of our independence. »

The bill, which is in the nature of a general programme of public undertakings, does not aim solely at the reorganization of the railway service. It also deals with the means of developing the agricultural and mining resources of Spain. We shall confine ourselves in this rapid analysis to the railway question. This question is the subject of the first section of the bill, and of its principal sub-sections (1).

The railways could not remain unaffected by the crisis to which reference has been made above. From the report of the board of management of the Northern Company (2) on the financial year 1920, we note that the total receipts were 276 689 445 pesetas, and that the total expenditure was 254 662 754 pesetas. There was therefore an excess of receipts over expenditure of 22 066 691 pesetas; but the expenditure does not include the sums advanced by the State, amounting to 22 079 963 pesetas for the year 1920.

As regards the Madrid-Saragossa-Alicante Railway, the report of the board of management for the financial year 1920 states that since 1912 the receipts have increased by more than 136 millions but that, on the other hand, the total expenditure has increased by more than 148 millions. The sums advanced by the State during the financial year 1920 amount to more than 20 millions, absorbing the excess of receipts over expenditure.

The transformation of the administration of the railways of general interest has therefore become inevitable.

We may recall briefly that Spanish legislation on this subject has passed through four distinct periods.

It begins with the *Royal Order* of the 31 December 1844. The underlying principle was that it would be preferable that the railways should be constructed and run by the State. The *Royal Order* only made concessions to private individuals or companies because of the then inability of the State to run the railways itself. The State further reserved the right to redeem a concession before the date of its expiration. Concessions were made under this regime in respect of about 1 478 km. (918 miles) of line.

The Act of the 3 June 1855 marked a new departure. Its object was to attract foreign capital to Spain for the construction of railways, by giving an assurance that it would be allowed to retain control for the whole period of the original concession. Section 19 of this Act stated that this capital would be protected by the State. The period of the concession was fixed at 99 years, the State to become

(1) This bill includes three sections : the first deals with railways, the second with roads, hydraulic undertakings, ports, the third with mines and agriculture.

(2) The two most important Spanish companies are the Northern Railway Company and the Madrid-Saragossa-Alicante Railway Company.

proprietor of the railway system and all its appurtenances at the expiration of the said period. About 6 065 km. (3 768 miles) of line, that is more than half the railway lines then in existence, were conceded under this regime.

The revolution of 1868 naturally affected the administration of the railways (1). The decree of the 14 November 1868 abolished State intervention, and instituted the perpetuity of the concessions without reversion to the State. It established a regime of absolute liberty as regards technical rules, tariffs and their application. Only 489 km. (304 miles) of normal gauge line were constructed under the regime. They were termed « free » lines.

Finally, the Act of the 23 November 1877, which is the general law regarding railways, supplemented and completed that of 1855, the most important points of which were retained. About 3 230 km. (2 007 miles) of normal gauge line were the subject of concessions accorded under the Act of 1877.

Before considering the new project of La Cierva, we may recall that in Spain there do not exist, between the government and the railway companies, agreements analogous to those which exist in France, as regards the system of subsidies to the companies.

Nor is there any guarantee in respect of railway shares and debentures.

The system of guarantee of interest on capital invested in the construction of railways does not apply except in the case of some secondary lines of recent construction. It has not had, in practice, any success as regards railways of general interest. Although it has been embodied in several legislative acts it has ended by becoming converted into subsidies or direct aid.

On the other hand, subsidies fixed per kilometre, whether or not in proportion to its net cost, have been very frequent. The State has also advanced repayable sums, either to aid in construction or to indemnify concession-holders for prejudices to their interests, such for instance as those resulting from civil wars.

We have just seen the increasing importance assumed by these advances. They rendered the reorganization of railway administration inevitable.

The general idea of the La Cierva bill is the creation of a Higher Railway Council, which shall be responsible to the Ministry of Public Works, and shall have the duty of keeping the Ministry informed on all technical, commercial and financial questions concerning the working of the railways (§ 1). This Council shall include representatives of the companies and of the personnel, and members representative of the general interests of the nation. The text is evidently inspired by the French proposals. As regards the financial aspect, the bill provides for the creation of a « consortium between the State and each of the concessionary companies for the working and improvement of the railways ». These provisions have a double object. They consolidate the considerable funds which the State has recently advanced to the companies to help them through the difficulties caused by the prolonged adjournment of the definitive solution of the railway problem, and they procure for the State a revenue from these funds. In the second place they prepare and facilitate the taking over of the railways by the State, which procedure is not authorized by legislation at present in force (§ 2). Each company will retain the administration and working of its own lines, though with the co-operation of State officials nominated by the Minister of Public Works. These officials

(1) On the subject of the important economic reforms resulting from this revolution see our *Étude sur la législation minière espagnole (A Survey of Spanish Mining Legislation)*. Jouve et Cie, Paris, 1921.

may also have a seat on the boards of management.

Further, the bill prescribes the method of calculating the financial participation in this consortium of each of the companies on the one hand, and of the State on the other. In the case of the companies it will be based roughly on the average value of the shares during the ten years immediately preceding the passing of the bill. Strong objections have already been formulated to an evaluation made under such conditions. This period of ten years in fact, includes the four years of war, during which the share quotations were at their lowest level. As regards the State, its participation will be based on the sums which have been advanced to the companies since the 1 January 1920 for the payment of personnel and purchase of rolling-stock. It will also include all future advances to the companies. From the date of the establishment of the consortium the State will receive interest on its participation at the rate of 5 %, which interest will be a charge on the companies.

Elsewhere (§ 3), provision is made for the payment to shareholders, during the duration of the consortium, of a fixed dividend calculated on certain rules, such dividend not to exceed 3 % of the proportion of capital recognised for each share in the constitution of the consortium. When all working expenses, including pensions and every financial charge, have been covered by the receipts, the companies and the State will have the right to receive, out of the surplus profits, a sum equal to 2 % of their proportion of capital, the companies to have participating preference over the State.

This clause assumes, *a priori*, the existence of profits. Also, in paragraph 4, the bill contains a clause similar to that of the French bill, of the United States « Railroad Bill » of 1920, and of the English « Railway Bill » at present under discussion, in accordance with which the tariffs must be such as to make it possible for the companies to cover all their expenses whatever they may amount to. These tariffs will be determined in the case of each company by the Higher Railway Council at the request of their board of management, and will be subject to the approval of the Minister. In case, however, the tariffs should be found to be too high, and consequently prejudicial to the economic development of the country, the « Council of Ministers » will have the power to reduce them after consultation with the board of management of the company concerned and with the Higher Railway Council. In such cases, however, the State undertakes to meet any deficit which may ensue.

This constitutes, in our opinion, an engagement on the part of the State which may be dangerous to the interests of the tax-payers. We have remarked above the considerable amount of the advances already made by the State to balance the companies' accounts. The companies have had to make further demands, in spite of the 15 % increase in tariffs voted on the 26 December 1918, and the suppression of a certain number of special rates for certain classes of goods. If the present proposal were adopted it would be necessary, if the companies' budgets were to be self-supporting, to increase tariffs again. This, however, is a measure which the country will not sanction at any price. It will always be easy to prove that such an increase is prejudicial to the economic development of Spain (1).

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(1) It is interesting to note that, at the last elections to the Cortes (19 December 1920), M. La Cierva distinguished himself by his violent campaign against any raising of railway rates. If his proposal is not to prove too burdensome to the State, it will be absolutely necessary to increase the rates. It will be remarked that M. La Cierva, who had previously been the champion of the opponents of

In short, the State, by reserving to itself the right to fix and to change tariffs, undertakes responsibility for the financial results of working. The companies, for their part, knowing that a fixed dividend is guaranteed to the shareholders, have no further responsibility to assume as regards their management. What industry has ever been known to prosper under such conditions?

It is true that, to encourage good administration on the part of the companies, the bill provides, as does the French bill, for the allocation to the railways of a premium on « economy and increases of traffic ». This premium, however, cannot exceed 1 % of the total participation of the company in the consortium.

As regards financial administration, the bill suggests the creation of a « special railway accounts section » of the Ministry of Finance, which shall at the same time maintain its connection with the Ministry of Public Works and with the Higher Railway Council (§ 6).

Among the questions with which this section will have to deal will be the accounts connected with subsidies made to the companies, the collection of the corresponding annuities, the participation of the State in the companies' profits, and the construction of new lines, the whole of the accountancy in connection with which will be centralised in the section. Its working will be governed by special regulations, the fundamental principle of which will be that the section is designed to separate the companies' budgets from the general budget of the State.

It may be noted that the State reserves the right to buy up the shares of any at will. The bill lays down the general lines of procedure in such cases (§ 5).

The bill deals with question of claims which may be made against the companies. It contemplates the creation of special tribunals (§ 14), composed of members of the magistrature and of the government. One of these tribunals is to function in each province, and there will be no appeal against its decisions other than to the Supreme Tribunal (1).

The bill also deals with questions of disputes which might occur between the companies and their employees. In the penultimate paragraph 19 it declares that such disputes shall be settled by the arbitration of the government. The latter shall formulate its decision after consultation with the Institute of Social Reforms (2). Its decision shall be binding on both parties.

This solution appears to us entirely unsatisfactory. The arbitrator possesses great interests in the working and administration of the railways. In these conditions can he have the impartiality necessary to settle the differences which will arise between the companies and their employees? If the Institute of Social Reforms, the competency and composition of which offer complete guarantees to both parties, were charged with the task of arbitration, and the government contented itself with confirming and ordering the execution of its decision, this would be a perfect arrangement. It is, in fact, a solution of this

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increased rates has had to bow to the evidence, and to admit that if it is desired to ensure the regular working of the railways it is necessary, however regrettable this may be in certain respects, to adopt this solution, to which every country is having to resort in its turn.

(1) This high court which is at the head of the judiciary organization, of which it is one of the most curious features, fulfils in litigious matters, the functions which in France devolve on the « Cour de Cassation » and the « Conseil d'État ». See *op. cit.*, p. 55.

(2) The Institute of Social Reforms, formed in 1903 to replace the « Commission of Social Reforms » plays an important part in all questions concerning the organization of labour. It counts among its members representatives of employers and workers in equal number. See *op. cit.*, p. 62.

nature which is proposed by the French bill. But this is not to be so in the case of the proposed Spanish legislation. The government is not obliged to follow the opinion expressed by the Institute of Social Reforms. This is, in our opinion, a delicate point which will certainly receive the attention of the Cortes.

We could not terminate this rapid summary of this bill, so long awaited in Spain, without calling attention to the end of paragraph 5 which interests us particularly in France. This paragraph deals with the buying up of the companies' shares by the State, and adds :

« The companies' shares will be converted into nominative shares; the proportion of foreigners on the boards of management will not exceed one-third of the total members, and it will not be possible for them to play an important part on these boards. It is to be clearly understood that henceforth all the companies will be considered as nationalised and subject to Spanish law. »

These proposals are obviously the culmination of the struggle against the foreigner, about which we have spoken elsewhere (1). As early as the 21 December 1900, a royal decree had exacted from the railway companies, if they were to be considered as Spanish, conditions which practically amounted to the expulsion of the foreign element. There is, however, this difference, that the provisions of this decree applied only to future concessions, whereas the present bill seems to suggest that the new provisions will apply to all companies at present in existence. Moreover, in the present ministry M. La Cierva is the colleague of M. Bugallal (2), the promoter of a bill submitted on the 20 November 1919, a proposal to require that Spanish nationality shall be a condition of the granting of a concession (1). The Hispanisation of industrial undertakings is not a vain threat. We should give serious attention to the question.

Let us compare with paragraph 5, paragraph 15, which is its logical consequence :

« All fixed or movable material necessary, either for the improvement of existing lines, or for the construction of new lines, shall be of Spanish construction. In cases where it should be necessary to import part of the material, it shall be necessary to prove the inability of Spanish industry to supply it within the required time. On this point, a report will have to be drawn up by the Higher Railway Council, the Council of Public Works, the Committee of Protection of National Industry, and the State Council. The Government will decide each individual case: it will be preferable, whenever the national interests permit it, to delay the execution of an undertaking until national industry is in a position to participate in it. In such cases it may even be possible to make subsidies to the works, provided the enterprises in question are of sufficient importance and are financially sound. »

This paragraph needs no comment. To assure national independence from the industrial point of view, to free the country from dependence on the foreigner, such is the programme evolved during recent years by politicians and economists such as Cristobal Masso, Viscount de Eda, and La Cierva.

Such is, in its general outline, the Spanish railway reform bill. If we exclude the creation of a Higher Railway Council which is pratically identical in both the French and Spanish bills; the principle that the financial stability of the railways must normally be ensured by the tariffs; and finally

(1) On the nationalisation of mines. See *op. cit.*, p. 97 *et seq.*

(2) Home Secretary in the present cabinet.

(1) *Op. cit.*, p. 102 *et seq.*

the institution of a premium on good management; we see that the two bills differ on many other points. The idea underlying the French bill is co-operation of the railways among themselves and with the State. It creates a state of financial stability which assures the establishment and maintenance of equilibrium between expenses of all classes and the receipts obtained from traffic. The common fund serves as a regulating factor in cases of increase or reduction of tariffs. In every case the Public Treasury must receive repayment of all its loans within a period of two years.

There is nothing similar to this in the Spanish bill. It is to be feared, indeed, that it will be the Public Treasury which will have to continue to salve the Companies' budgets. It will give subsidies for the purchase of material and the construction of lines, whereas in the French proposals the companies themselves will be able to make the necessary payments to the State in respect of its share in the construction. Further, the French companies will have the power to issue debentures of a uniform type, interest on which will be guaranteed by the common fund, and by the State at the expiration of the concession.

We may also remark in conclusion that the French bill has been drawn up in consultation with the companies' authorised representatives. The Spanish bill, of one-sided origin, is to be imposed on the companies.

M. La Cierva himself has admitted that he had consulted only two of them. Such a reform, however, can only give good results if the two parties concerned have of their own free will accepted the method of procedure.

These differences show in what way the French bill is superior to the Spanish bill, and more advantageous to the State.

We thought it advisable to deal with the La Cierva bill because of the large French interests concerned in the Spanish railways. This bill, moreover, confined itself to laying down the « basis » which will serve for the elaboration of railway legislation. Within one month after the passing of the bill, the government must introduce such legislation. This practice of establishing a « basis » is of frequent occurrence in Spanish legislative procedure. The present mining legislation of that country derives from the « basic-decree » of the 29 December 1868. The mining bill which was intended to make it complete has often been presented. It has never been passed.

Is the same fate reserved for the railway bill? The discussions which are about to take place in the Cortes will enlighten us on this subject, and will show us if Spain is capable of shouldering the considerable financial burden entailed by this reform.

MISCELLANEOUS INFORMATION

[625 .143.1 (.94)]

1. — Australian standard rail sections.

Fig. 1, p. 456.

(*Engineering News-Record*).

The adoption of standard rail sections and rail specifications for all the railways of the Commonwealth of Australia by the railway engineers and commissioners of the several states and by the steel manufacturers constitutes an important step in the railway and industrial development of Australia. These new standards now apply to the continental states of New South Wales, Victoria, South Australia, Queensland and Western Australia, and to the two island states of Tasmania and New Zealand, in all of which the railways are owned and operated by the governments under the direction of railway commissioners. The type of rail section is at variance with American principles of rail

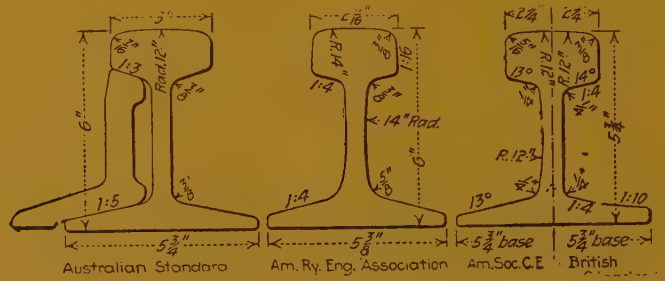


Fig. 1. — Comparison of Australian, American and British 100-lb. rails.

design. The following brief history of this development is from a pamphlet issued by the Institute of Science and Industry (Commonwealth of Australia).

Sections of rails and splice bars were decided upon at an interstate conference of railway engineers held in Melbourne in July 1914. Drawings and specifications were approved in 1915, but owing to war conditions the approval of the railway commissioners was not obtained. In 1919 a conference, at which both the state railway engineers and the steel manufacturers were represented, was called by the Institute of Science and Industry, which was interested in railway standardization and in making Australia self-supporting as to steel products. Rail sections and specifications were adopted at a fourth engineering conference in 1920. The specifications were considered later at an interstate meeting of railway commissioners, but amendments then suggested were not acceptable to the manufacturers. An agreement was reached, however, and the specifications were approved at a conference of railway engineers and steel manufacturers, held at Sydney in April 1921. Finally, these specifications were approved at a conference of railway commissioners.

Rail sections.

Five standard sections have been adopted, from 60 to 100 lb. per yard. A broad shallow

head with round corners, a tall thin web and an exceptionally shallow base are typical features of the design. Cracks due to a thin base have been an unfavorable experience with the sections of the American Society of Civil Engineers, but the Australian sections have an even thinner base. An unusual feature is that different fishing angles are used for the top and bottom fishing surfaces. The very marked difference between the Australian and American Railway Engineering Association section is shown in figure 1, which gives also the American Society of Civil Engineers and British standard sections. A comparison of these four types of rail sections is given also in table I.

TABLE I. — **Comparison of 100-lb. rails sections.**

—	Australian Standard.	American A. R. E. A.	American A. S. C. E.	British Standard.
Height, inches	6	6	5 3/4	5 3/4
Width of base, inches	5 3/4	5 3/8	5 3/4	5 3/4
Width of head, inches	3	2 11/16	2 3/4	2 3/4
Side of head : slope	Vertical.	1 to 16	Vertical.	Vertical.
Depth of head, inches	1 20/32	1 21/32	1 45/64	1 53/64
Depth of web, inches	3 14/32	3 9/32	3 5/64	3
Depth of base, inches	30/32	1 1/16	62/64	59/64
Web thickness, inches	37/64	9/16	9/16	37/64
Radius of head, inches	12	14	12	12
Radius : top corners, inches	7/16	3/8	5/16	3/8
Radius : bott. corners, inches	1/16	1/16	1/16	1/16
Radius : top fillets, inches	3/8	3/8	1/4	1/4
Radius : bott. fillets, inches	3/8	5/8	1/4	1/4
Radius : top edge base, inches	1/16	1/16	1/16	1/16
Radius : bott. edge base, inches	1/16	1/16	1/16	Sharp.
Radius : sides of web, inches	Vertical.	14	12	Vertical.
Fishing angles : top	1 : 3	1 : 4	1 : 3	1 : 4
Fishing angles : bottom	1 : 5	1 : 4	1 : 3	1 : 4 + 1 : 10
Metal in head, %	...	38. 2	42	45
Metal in web, %	...	22. 6	21	19
Metal in base, %	...	39. 2	37	36

Four grades of steel are included in the Australian specifications : Ordinary basic open hearth and acid Bessemer steel and high-silicon basic open hearth and acid Bessemer steel, the last two being made by the process of the late C. P. Sandberg. From the chemical compositions as given in table II it will be noted that for ordinary steel the

carbon content varies with the weight, while for the high-silicon steel it is uniform. For the ordinary steel, a minimum silicon content is specified, instead of the usual maximum content. It is provided that the carbon may be increased 0.02 % above the limits specified, on condition that for each 0.01 % increase in carbon the phosphorus will be reduced 0.005 % below the specified limit. Further, it is desired that the carbon percentage shall average as high as the mean percentage between the upper and lower limits specified.

TABLE II. — **Comparison of chemical composition of rails.**

——	Carbon, in per cent.	Manganese, in per cent.	Silicon in per cent.	Phosphorus, in per cent. (Maximum).	Sulphur in per cent. (Maximum).
1. *Australian*	...	...	...	...	...
O.-H., 60-lb.	0.46-0.59	0.6-0.9	0.10minimum	0.04	0.07
O. H., 100-lb.	0.62-0.75				
Bessemer, 60-lb. . . .	0.42-0.52	0.6-0.9	0.10minimum	0.07	0.07
Bessemer, 100 lb. . . .	0.60-0.70				
O.-H., high silicium . .	0.50-0.65	1.0 maximum	0.2-0.4	0.06	0.06
Bessemer, high silicium .	0.40-0.55	0.7-1.0	0.3-0.5	0 07	0 07
2. *American Railway Engineering Association* . . .	...	...	...	...	...
O.-H., 85 to 110-lb. . .	0.45-0.55	0.8-1.1	0.1 minimum	0.10	Not spec.
Bessemer, 85 and over. .	0.62-0.77	0.6-0.9	0.1 minimum	0.04	Not spec.
3. *British*	0.35-0.50	0.7-1.0	0.1 maximum	0.07	0.07

Six-bolt joints are used, with angle splice bars (see drawing) having a uniform length of 30 inches and a bolt spacing of 5 inches, with 1-inch bolts for 100- and 90-lb. rails, 7/8-inch for 80 lb. and 3/4-inch for the others. For 1-inch bolts, the bolt holes are 1 1/16 × 1 5/16 inches for the splice bars and 1 1/4 inches in diameter for the rails. All the bars are slotted for spikes, but they are kept clear of any bearing on the ties, as shown. The calculated weights per pair of splice bars are from 59.75 lb. for the 60-lb. rail to 96.90 lb. for the 100-lb. rails.

Splice bars are to be made from basic open hearth or acid Bessemer steel : Carbon, 0.40 to 0.53 % for the former and 0.35 to 0.45 for the latter; phosphorus not to exceed 0.04 and 0.07 % respectively. For both kinds of steel the manganese is to be 0.55 to 0.85 % ; silicon not less than 0.05, and sulphur not exceeding 0.70. Carbon may be increased in proportion to decrease of phosphorus, as already noted in the rail specifications. Test pieces 0.564 inch in diameter and 2 1/4 inches long, with a gage length of 2 inches, must show an ultimate tensile strength of 80 000 to 107 000 lb. per square inch, with an elongation of not less than 15 %.

[621 .132.4 (.73) & 621 .132.5 (.73)]

2. — New locomotives for the Missouri Pacific.

Figs. 2 to 4, pp. 460 to 464.

(*Railway Mechanical Engineer.*)

The Missouri Pacific has recently added to its equipment 50 locomotives built by the American Locomotive Company. This includes 15 six-wheel switchers (0-6-0 type), 25 Mikado (2-8-2 type), 5 Pacific (4-6-2 type) and 5 Mountain (4-8-2 type) locomotives, none of which types is new on this road. The six-wheel switchers are of the same design as those received about a year ago; the Pacific type engines are practically a duplicate of those previously built, while the Mikado and Mountain types are of entirely new designs.

Mikado type.

The Mikado locomotives previously used were of the government light, or U.S.R.A. 2-8-2-A type allocated to the road during the war. These engines are of 54 600 lb. tractive effort, have 26 inch by 30 inch cylinders, the total weight being 290 800 lb., with 221 500 lb. on drivers and 63 inch wheels. The new locomotives have 10 % greater tractive effort and an equivalent increase in weight and are handling 10 % greater tonnage. Among the special features are floating bushings for the middle connection bearings which are giving much better satisfaction on engines of this size than the stationary bushings previously used; Alco reverse gear; Duplex type D stokers; Franklin grate shakers and adjustable driving box wedges; Chicago flange lubricators and Jemco unit spark arresters which are said to be an improvement over the master mechanics' design in ease of application, convenience in maintenance and reduction of fire hazards.

The boilers of the Mikado type as well as the other locomotives are equipped with Harter circulating plates which it is estimated have added 10 % to their capacity. This device consists essentially of a horizontal plate slightly below the center line extending entirely across the boiler from a point just behind the feedwater inlet to within about 6 inches of the back tube sheet. Outlets for steam are provided by pipes placed at intervals on either side which lead to the steam space at the top of the boiler barrel. The general arrangement is shown in the drawing of the boiler for the Mountain type locomotives.

On the Mikado locomotives the boiler horsepower is 93.9 % of the cylinder horsepower without allowance for the circulating plate and on the Mountain type, the rated boiler power is even less. All of the engines have, however, proved to be free steamers in service.

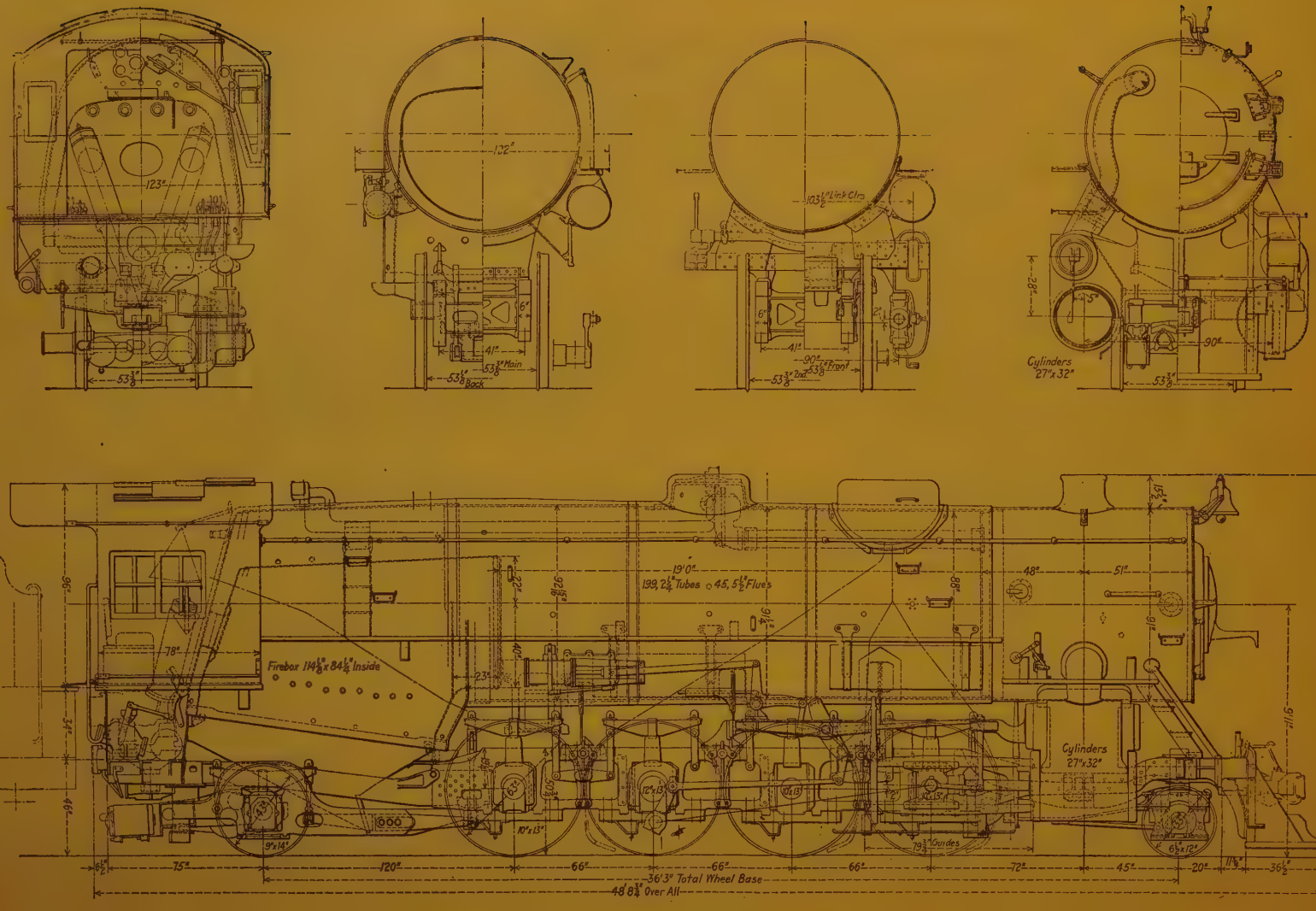
Delta trailing trucks, equalized with the drivers and equipped with brakes, are used on all road engines. Of the 25 Mikado engines, two are equipped with boosters and provision is made for their future application to the other engines. In actual service it has been found that the locomotives equipped with boosters can handle 13 1/2 % more tonnage than the same design of engines without the booster.

The booster increases the tractive effort 9 000 lb. and adds 3 500 lb. more weight on the trailing truck, 4 500 lb. more on the drivers and 1 000 lb. less on the front truck.

The ruling grade on the line where the boosters are used is 5 miles long so that the demand on the boiler for steam to supply the booster as well as the locomotive cylinders is severe and prolonged and any lack of capacity would be developed quickly. In actual tests the locomotives have handled a full tonnage over the ruling grade at a speed of approximately 10 miles per hour. With the reverse lever in the corner, the throttle wide open and the injector on, full boiler pressure was maintained.

Mountain Type.

The Missouri Pacific has been using for some time a number of U.S.R.A. 4-8-2-A light Mountain type locomotives which have a tractive effort of 53 900 lb., 27 inch by 30 inch


123"
53⅜"
102"
6'
41"
53⅜" Main
53⅜" Back
103½" Link Ctrs
6'
41"
90"
53⅜" 2nd
53⅜" Front
32"
90"
Cylinders
27"x 32"
53⅜"
Firebox 114⅛"x 84⅛" Inside
19'0"
139, 2¼" Tubes 45, 5½" Flues
78"
23"
48"
51"
88"
96"
32"
99"
10'9"
9'11"
Cylinders
27"x 32"
12"x 13"
10"x 13"
10"x 13"
9"x 14"
10"x 13"
19¾" Guides
6½"x 12"
6½"
75"
120"
66"
66"
66"
72"
45"
20"
11⅞"
36½"
36'3" Total Wheel Base
48'8¾" Over All

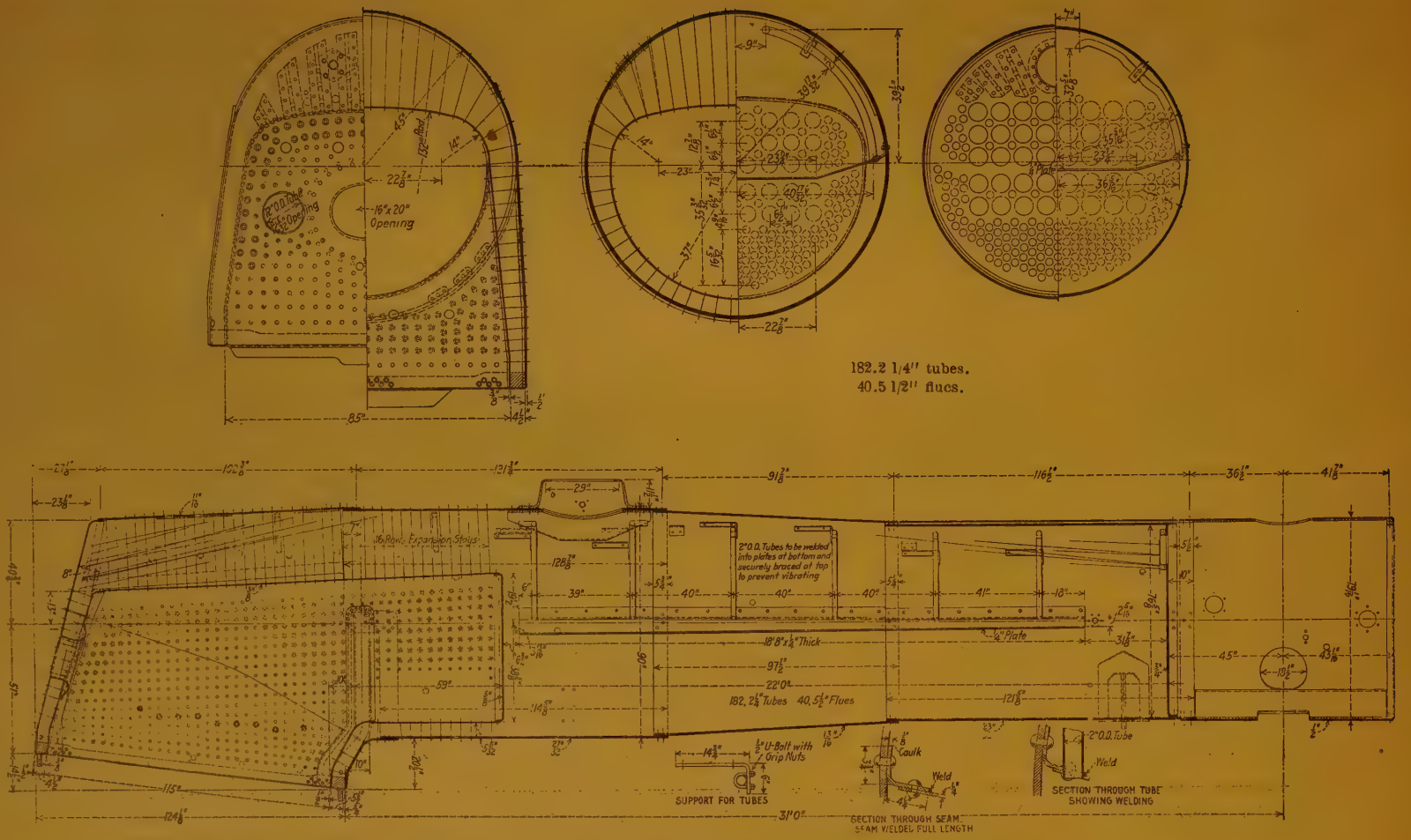


Fig. 3. — Sections of boiler with Harter circulating plate for Mountain type locomotive.

Comparison and ratios of the Missouri Pacific's new locomotives.

	0-6-0 Switcher	*2-8-2 Mikado* (1).	*4-6-2 Pacific.*	*4-8-2 Mountain.*
Tractive effort (85 %)	39 100 lb.	59 800 lb.	39 500 lb.	53 500 lb.
Cylinders, diameter and stroke	21 in. by 28 in.	27 in. by 32 in.	26 in. by 26 in.	27 in by 30 in.
Valves, size and kind	10 in. piston.	14 in. piston.	14 in. piston.	14 in. piston.
Greatest travel	6 in.	7 in.	6 1/2 in.	7 in.
Lap	1 in.	1 3/16 in.	1 1/8 in.	1 1/4 in.
Exhaust clearance	1/16 in.	0	3/16 in.	3/16 in.
Lead in full gear	0	1/8 in.	3/16 in.	3/16 in.
Weight in working order :				
On drivers	163 000 lb.	233 000 lb.	166 500 lb.	226 000 lb.
On front truck	...	30 500 lb.	49 000 lb.	52 500 lb.
On trailing truck	...	56 500 lb.	52 000 lb.	56 500 lb.
Total engine	163 000 lb.	320 000 lb.	267 500 lb.	335 000 lb.
Total engine and tender	287 800 lb.	510 000 lb.	435 700 lb.	527 800 lb.
Wheel base, driving	11 ft. 6 in.	16 ft. 6 in.	13 ft. 0 in.	19 ft. 7 in.
Rigid	11 ft. 6 in.	16 ft. 6 in.	13 ft. 0 in.	12 ft. 8 in.
Total engine	11 ft. 6 in.	36 ft. 3 in.	33 ft. 7 in.	41 ft. 4 in.
Total engine and tender	43 ft. 10 1/2 in.	71 ft. 1 1 2 in.	67 ft. 3/4 in.	77 ft. 2 in.
Wheels and journals :				
Driving, diameter over tires	51 in.	63 in.	73 in.	73 in.
Driving journals, main	9 1/2 in. by 12 in.	12 in. by 13 in.	10 1/2 in. by 12 in.	12 in. by 13 in.
Driving journals, front	9 in. by 12 in.	10 in. by 13 in.	10 in. by 12 in.	10 in. by 19 in.
Driving journals, others	9 in. by 12 in.	10 in. by 13 in.	10 in. by 12 in.	10 in. by 13 in.
Boiler, style :	Ext. Wagon Top.	St. Top.	Ext. Wagon Top.	Conical Conn.
Diameter, inside first ring	64 11/16 in.	88 in.	72 3/8 in.	76 5/8 in.
Steam pressure	190 lb.	190 lb.	193 lb.	210 lb.
Firebox, length and width	78 in. by 70 1/4 in.	114 1/8 in. by 84 1/4 in.	108 in. by 66 in.	114 1/8 in. by 84 1/4 in.
Grate area	38 sq. ft.	67 sq. ft.	49.5 sq. ft.	67 sq. ft.
Tubes, number and diameter	158—2 in.	199—2 1/4 in.	207—2 in.	182—2 1/4 in.
Flues, number and diameter	24—5 1/2 in.	45—5 1/2 in.	32—5 3/8 in	40—5 1/2 in.
Tubes and flues, length	14 ft.	19 ft.	20 ft	22 ft.

(1) The weights and ratios for those without booster.

Comparison and ratios of the Missouri Pacific's new locomotives *(continued)*.

	0-6-0 Switcher	*2-8-2 Mikado* (1).	*4-6-2 Pacific.*	*4-8-2 Mountain.*
Boiler, style *(continued)*.	Ext. Wagon Top.	St. Top.	Ext. Wagon Top.	Conical Conn.
Heating surface, firebox	145 sq. ft.	263 sq. ft.	207 sq. ft.	300 sq. ft.
Heating surface, arch tubes	...	27 sq. ft.	26 sq. ft.	27 sq. ft.
Heating surface, tubes	1 149 sq. ft.	2 214 sq. ft.	2 155 sq. ft.	2 346 sq. ft.
Heating surface, flues	480 sq. ft.	1 223 sq. ft.	895 sq. ft.	1 261 sq. ft.
Heating surface, total evaporative	1 774 sq. ft.	3 727 sq. ft.	3 283 sq. ft.	3 934 sq. ft.
Superheating surface	393 sq. ft.	1 051 sq. ft.	778 sq. ft.	1 084 sq. ft.
Equivalent heating surface (1).	2 363 sq. ft.	5 303 sq. ft.	4 450 sq. ft.	5 560 sq. ft.
Tender :				
Water capacity	6 000 gallons.	10 000 gallons.	8 000 gallons.	10 000 gallons.
Fuel capacity	10 tons.	16 tons.	14 tons.	16 tons.
Ratios :				
Weight on drivers ÷ tractive effort.	4.3	3.9	4.2	4.2
Total weight ÷ tractive effort	4.3	5.3	6.8	6.3
Tractive effort ÷ equivalent heating surface	16.5	11.3	11.3	9.6
Tractive effort × diameter drivers ÷ equivalent heating surface	844	711	823	702
Equivalent heating surface ÷ grate area	62.3	79.2	89.9	83.0
Weight on drivers ÷ equivalent heating surface	68.9	43.9	37.4	40.6
Total weight ÷ equivalent heating surface.	68.9	60.4	60.1	60.3
Firebox heating surface ÷ equivalent heating surface, per cent.	6.1	5.0	4.6	5.4
Volume of cylinders, cubic feet	11.2	21 18	15.96	19.86
Equivalent heating surface ÷ volume cylinders	211	250	278	280
Grate area ÷ volume cylinders	3.4	3.2	3.1	3.4
Superheater surface ÷ evaporative surface, per cent	22.1	28.2	23.7	27.5

(1) Equivalent heating surface = total evaporative heating surface + 1.5 times the superheating surface.

cylinders, total weight 327 000 lb., 224 500 lb. on drivers and 69 inch wheels. The new locomotives were designed for the same service and to correct some of the troubles which have been experienced with the older ones. In attempting to make pronounced changes in the design, an interesting problem was encountered owing to the fact that the condition of bridges and structures on the section of the road where the engines were to be used necessitated limiting the weight on the drivers to 226 000 lb.

The size of the driving wheels was increased to 73 inches to fit them better for the speeds at which the passenger trains are scheduled and lateral motion driving boxes were applied on the front pair of drivers to lessen the rigid wheel base and eliminate the trouble with hot bearings. These modifications naturally necessitated a longer boiler which would tend to increase the weight beyond that allowable. The previous engines had a rated boiler horsepower capacity of 97.5 per cent of the cylinder horsepower. In order to keep the weight within the maximum allowable, it was decided to reduce the boiler size so that its rated horsepower was only 85.3 per cent of the cylinder horsepower This it was thought could be done safely by using Harter circulating plates to increase the boiler capacity. In the new design the boiler pressure was increased from 200 lb. to 210 lb., the firebox was made 6 inches shorter, the length of tubes was increased from 20 ft. 6 in. to 22 feet and the number decreased from 260 to 182.

The new Mountain type locomotives are being run in a pool with the older locomotives and consequently both are handling the same trains on the same division. Both designs have the same size cylinders. Despite the smaller boiler, the new engines steam just as freely as the older ones, are running with 3/4 in, larger exhaust nozzles, are making better fuel records and take the same train 30 miles further for water.

The locomotives are provided with floating bushings in the middle connections and the same attachments furnished on the Mikado type. Boosters were not applied but provision was made for their attachment in the future.

Fig. 4. — Booster and Delta truck used on Mikado locomotives.

As has been stated, the Pacific and switch engines are practically the same as previous engines but are provided with Harter circulating plates. The Pacific type locomotives are operating with exhaust nozzles from 1/2 in. to 3/4 in. larger than was previously possible and are showing an improved fuel record and better performance in general than the older design of locomotives.

A table showing the principal dimensions and ratios of the four types of locomotives is given for comparison with other designs.

[625 232 (.42)]

3. — Great Northern train service between London and West Riding of Yorkshire.

Figs. 5 to 7, pp. 466 and 467.

(*Railway Gazette.*)

The Great Northern Company's route between London and the manufacturing towns in the West Riding of Yorkshire is the shortest, and for many years the train service has held a well-deserved reputation as being a most convenient and comfortable one. No efforts are being spared at the present time in the endeavour to maintain and add to this reputation.

It is interesting to note in this connection that the first dining car to be run on a British railway was provided on the Great Northern Railway Company's London and Leeds service so long ago as 1879. This initial step was followed by continual development of the train service and increased facilities to ensure the comfort of passengers. At the present time all the express trains between London and the West Riding of Yorkshire are composed of up-to-date bogie vehicles, and are provided with first and third-class breakfast, luncheon or dining cars.

For a railway journey taking several hours a most important consideration from the point of view of the passengers' comfort is the smooth running of the carriages. Particular attention has been given to this subject in the construction of carriages at the company's works at Doncaster, and the latest development is the provision of a new luncheon and dining car train of special construction, embodying various improvements of a novel character.

The new train is now daily forming part of the 10.10 a. m. King's Cross to Leeds (due 2.10 p.m.), returning from Leeds at 5.30 p.m. (due King's Cross 9.30 p.m.).

Train constructed on articulated principle.

The train is built on what is known as the articulated principle. It consists of five carriages and is carried on six bogie trucks only. By this arrangement the riding of the train is improved, oscillation being reduced to a minimum. Further, the weight of the train is considerably reduced, which is an important point, as the cost of haulage is thereby lessened.

The composition of the train is as follows :

First-class carriage brake . . .	55 ft. 2 1/2 in. long.
First-class dining car	45 ft. 11 in. long.
Kitchen and pantry car	37 ft. 6 in. long.
Third-class dining car	45 ft. 11 in. long.
Third-class brake	55 ft. 2 1/2 in. long.

The train can be lengthened by the addition of ordinary corridor carriages at either end as necessary.

Vestibule connections.

The train is vestibuled throughout, and the connections between the various coaches forming the train differ altogether from the vestibules generally employed in this country, the distance between the carriages being so much shorter that a permanent connection can be made which is weatherproof and draughtproof, and, owing to the absence of connections by which the ordinary carriages are coupled and uncoupled, the noise and clatter which is necessarily associated with these connections is obviated.

The Great Northern Railway have had a large number of carriages running on the articulated principle for many years past, but this is the first dining car set which has been constructed on that principle and is the longest unit of its kind running.

Ventilation.

Special attention has been paid to the ventilation of the train. The dining cars are provided with large plate glass windows 4 feet wide, which passengers can lower or raise by means of a handle fixed above the table in front of the window. Above these windows are provided two small fanlights, which open

outwards and are under the control of the passengers.

Instead of fans being fixed in the usual position on the end partitions of the dining cars, electric extractor fans are provided in the roof of the carriage for extracting the impure air from the carriages. In addition to these, the usual torpedo ventilators are provided, which can be opened or closed at will by means of handles conveniently situated on the side panels.

Lighting.

Semi-indirect electric lighting is provided in the dining cars, the lamp fittings being fastened in the centre of the roof. The first-class saloon is provided with alabaster bowls, 12 inches diameter, and in the third-class saloon are fitted obscured glass bowls. In addition to these, table lamps are provided in the first-class saloon. Each of the bowls is provided with four 25 candle-power half-watt lamps. The total candle-power provided in the first-class dining saloon being 750 and in the third-class 600. The light is so diffused by means of the plain white roof and the indirect fittings that there is an entire absence of glare and all objectionable shadows are obviated.

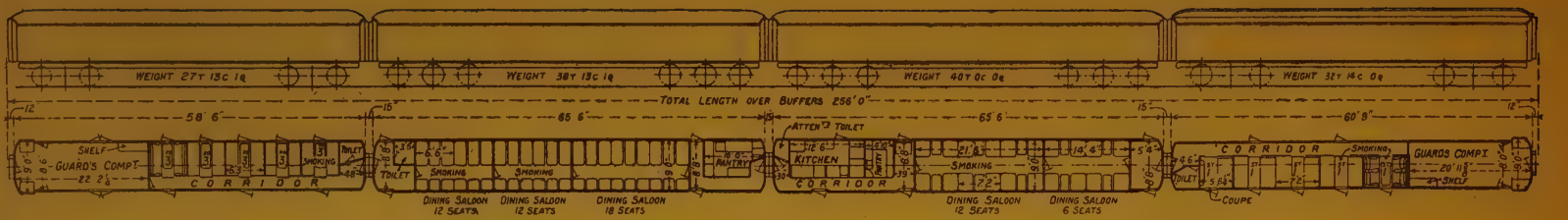
The lights throughout the unit can be controlled either from the guards' vans or by the dining car conductor.

Interior decorations.

The tendency in recent years in the decoration of dining cars and other railway carriages has been to make them more and more ornate, but in dealing with the scheme of decoration in the new train this tendency has been entirely reversed.

The prevailing note in the whole scheme of decoration, both of the compartments and of the dining cars, is simplicity. No mouldings whatever have been used in the first-class dining car, and there is no decoration of any sort on the roof. The walls of the car are lined with plain natural-coloured mahogany panels, the panels being made as large as possible so as to reduce the number of joints

Fig. 5. — New articulated dining car train on the London-Leeds service, Great Northern Railway.



3rd class brake. 30 passengers.

Total pairs of wheels : 20

3rd class dining car. 42 passengers.

Total weight : 139 t. 3 c. 2 q.

1st class dining car. 20 passengers.

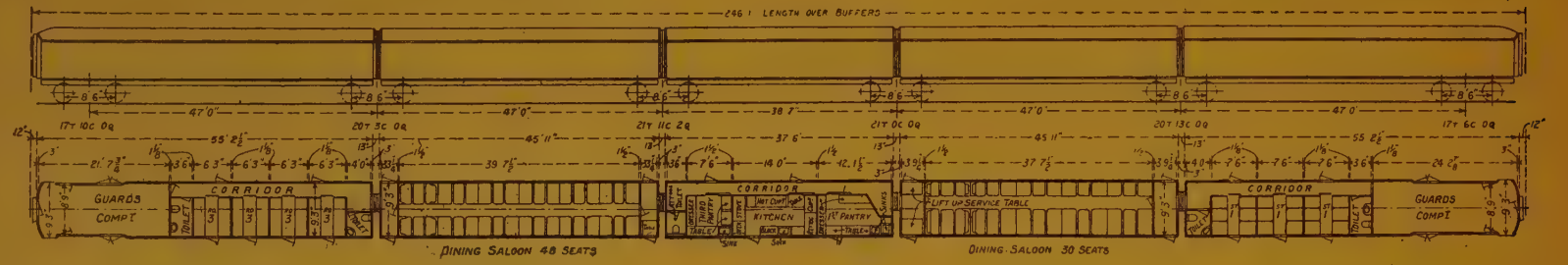
Total number of passengers : 38 firsts. 72 thirds.

Total luggage space : 43' 1 7/8"

1st class brake. 18 passengers.

Total length : 256'0"

Fig. 6. — Existing vehicles running in 10.10 a. m. King's Cross to Leeds train.



3rd class brake. 32 passengers.	3rd class dining car. 48 passengers.	Kitchen car.	1st class dining car. 30 passengers.	1st class brake. 18 passengers.
Total pairs of wheels :	Total weight :	Total number of passengers :	Total luggage space :	Total length :
12	118 t. 3 c. 2 q.	48 firsts. 80 thirds.	45' 10 5/8"	246' 1"
Decrease 8	20 t. 17 c. 0 q.	... ...	...	9' 11"
Increase	... ...	10 firsts. 8 thirds.	2' 8 3/4"	...

Reduction in weight per foot run . . . . . 140 lb. = 11.5 %

Reduction in weight per passenger . . . . . 763 lb. = 27 %

Fig. 7. — Five-coach set for 10.10 a. m. King's Cross to Leeds dining train. To replace the four vehicles shown above.

to a minimum; and neither carving, fluted moulding, nor even cornice mouldings are provided. The roof and ends of the dining saloons above the panels are also absolutely plain, being painted dead white. The usual hat racks and hat pegs are provided, and are all of the plainest possible design.

Seating capacity.

Full advantage has been taken of the width allowed by the loading gauge, and, in consequence, it has been possible to seat in the first-class carriages six persons in each section, two seats and one table being provided on one side of the gangway and four seats and one table on the other. In the third-class dining car eight persons can be seated in each section, each table being arranged for four passengers.

The seats in the first-class compartment are of the armchair type, comfortably upholstered in green tapestry. The tables are of polished mahogany, and the tops are covered with green morocco leather. Each table has a loose cover of green leather, lined with green felt. The floor is covered with crimson Wilton pile carpet, and the lobbies at each end are covered with green and white india-rubber tiling.

The seats in the third-class dining car are also of the armchair type, upholstered in crimson and black pile. The floor is covered with « Kork » linoleum.

Cooking installation on dining car train.

The new train embodies many novel features, of which, perhaps, the principal innovation is the exclusive use of electricity for cooking, instead of gas, which is employed on all other dining cars.

The train comprises a well-appointed travelling restaurant in which luncheon or dinner can be served for 78 persons at the same time. Everything is prepared and cooked entirely on the train, the kitchen being provided with a complete equipment of electric cooking apparatus. While individual pieces of apparatus such as electric kettles, urns, food warmers, etc., are frequently used in railway carriages, this is the first dining car train on which the cooking is entirely done by electricity, and naturally the details of the application have required special consideration.

A brief description of the cooking apparatus will no doubt be of interest in view of the novelty of the application, the credit of which is due to the enterprise of the chief mechanical engineer, Mr. H. N. Gresley, C. B. E., under whose personal supervision the work has been carried out. The whole of the apparatus has been supplied by J. Stone & Co., Limited, of Deptford, London, whose well-known system of electric lighting is also fitted on the train.

In the interior of the kitchen the main cooking range is fitted across one end, and there is on the left a roasting oven, with steaming oven, grill and hot water tank superimposed. On the right are placed the boiler range with four hot plates for frying, boiling or heating sauces, etc., and two boiling pans of 10 gallon capacity for cooking vegetables, etc. On one side of the kitchen, between the serving hatches, the hot cupboard is fitted; this has sufficient capacity for heating the whole of the plates, etc., required for the service, and the top forms a convenient table. A separate fish fryer measuring 18 inches long by 11 inches wide by 7 inches deep is provided for use when required. A 2-gallon urn and two 6-pint kettles are available for boiler water for teas, and to supplement the supply from the boiler on the top of the oven range.

The provision of adequate supplies of boiling water and hot water for washing up and other purposes constitutes a continuous demand on the available electrical energy. There is a 40-gallon tank for warm water fitted in the roof of the corridor alongside the kitchen, and heating elements are clamped to the underside of this tank. From the warm water in this tank the boiler on top of the oven range and the hot water urn are supplied, and this enables boiling water to be obtained much more quickly when required.

Electrical equipment.

The control of the cooking equipment in the kitchen is arranged as conveniently as possible for the chef. A main throw-over switch on the switchboard enables the load to be switched over from the preliminary alternating current supply at the terminal station to the direct current supply from the battery and dynamos before leaving the terminal station. Subsidiary boards are provided for each main group or important element of the apparatus, carrying separate switches for the control and regulation of the heat of individual elements. Pilot lamps are set over the switches illuminating red glasses inscribed with the name of the apparatus in use, so that at a glance an indication is obtained of the operations that are going on.

The necessary electrical energy for operating the cooking apparatus while the train is under way is provided by two of Stone's dynamos, of their « Lilliput » type, carried on the underframe of the kitchen car, supplemented by a battery of accumulators to enable cooking operations to be continued during intermediate stops. The dynamos are each of 6-kw. capacity with self-contained automatic pole changers, and are belt-driven from the axle of the carriage.

Automatic switch gear is provided for the control of the machines, to connect them with the battery and the cooking equipment as soon as the machine is running at the predetermined speed and disconnect them on falling below this speed.

A battery overcharge preventing switch automatically diverts a portion of the current from the batteries as soon as the fully charged condition is reached, causing the voltage to rise above a certain point and operate the switch; the current so diverted from the batteries is usefully employed by passing it through a supplementary heater applied to the warm water tank in the corridor.

The automatic cut-in switches and potential overcharge switches are of special design, constructed on the principle of Stone's standard apparatus, but to suit the higher voltage of the present application they are made with double pole switch brushes and carbon break on each pole, with other modification of detail as necessary to meet the special conditions.

As a safeguard against an excessive load being imposed on the dynamos and battery while in service, an overload circuit breaker is fitted to operate when the current exceeds the normal running load, and before this will hold in (on the level being replaced) the load has to be reduced by turning off or reducing to lower heat one or other of the cooking elements.

An ammeter and 3-way switch enables the output of either dynamo or the total load due to the apparatus in use to be raised at any moment; and an ampere-hour metre is fitted, indicating the state of charge of the battery.

The accumulators are small, only measuring 3 inches by 6 3/8 inches by 14 3/4 inches, and are of light weight, high capacity type, 9-plate size, in ebonite boxes with lids sealed down. They have screwed vent plugs for access to the acid for taking gravity and refilling, etc. The battery comprises 80 cells, 10 cells in a crate, there being eight crates arranged in two boxes on the underframe. The weight of the complete battery is 1 880 lb. A link is provided at each battery box, and by disconnecting this link the battery circuit may be broken at an intermediate point, so that the potential difference at each battery box does not exceed 40 volts in any section while the apparatus is under examination.

The main switchboard on which the throw-over switch is fitted carries four pairs of fuses for the main groups of apparatus, and fuses for the individual heating elements are carried on the subsidiary distribution switchboards.

The cooking range, ovens, boilers, etc., were made by the Jackson Electric Stove Company, to meet the special requirements of the installation.

The wiring is carried in enamelled screwed conduits, which are earthed, as also are the frames or casings of the various cooking apparatus. The plug connections for the electrical supply from the station mains are interlocked with a valve on the train pipe, a lever controlling this valve being so placed

that while the plug is connected the valve is open and a vacuum cannot be created in the train pipe.

Additional sockets are arranged for conveniently charging the battery at terminal stations, so that on emergency the batteries can be readily re-charged should they, through any exceptionally heavy demands on the journey, have been exhausted.

As a check against any accidental or unforeseen damage to the installation of the equipment, two indicating lamps are provided on the main switchboard connected in series between the mains. By switching on a tumbler-switch these are lit in series, and on pressing a button the intermediate connection between the two lamps is earthed; any considerable reduction in the insulation resistance of one pole of the circuit as compared with the other will be indicated by the difference in brightness of the two lamps.

The advantages of cooking by electricity in a railway train will be apparent to everyone, but special mention should be made of the better conditions from the point of view of cooler and purer atmosphere under which the chef is able to do his work.

It is not perhaps generally known that meat which has been cooked electrically is better cooked and more palatable and also more nutritious than meat cooked by gas, and this fact has led to this method of cooking in the high class restaurants in London and the other capitals. It is also cleaner, and the temperature of an electric kitchen is much lower than that of a gas kitchen. The objectionable smell of gas is, of course, obviated.

[656 .254 (.42)]

4. — New automatic telephone switchboard at Waterloo station, London & South Western Railway.

Figs. 8 to 11, p. 472.

(*Railway Gazette.*)

A four-position manually-operated switchboard was brought into use at Waterloo Station in July 1914, being the first to combine the railway omnibus, selective, and other circuits with the Post Office telephone exchange circuits on one switchboard, multiplied so that all the four operators could connect any two lines on the switchboard without moving from their seats. The new telephone switchboard required to serve the Feltham Gravitation Yard, and extensions of the railway company's telephone system to include Woking, Reading and Windsor, necessitated an extension of the telephone switchboard at Waterloo. Instead of enlarging the present manually-operated board, a new 50-line automatic telephone switchboard has been installed to cover all connections required for the offices of the Superintendent of the Line and of the London District Superintendent. It is believed that this is the first automatic telephone switchboard of similar capacity to be installed by any British railway.

It has been designed and installed under the supervision of Mr. W. J. Thorrowgood, Signal and Telegraph Superintendent of the London & South Western Railway, and as the work is now completed — the equipment being satisfactorily brought into working order on 19 September — it will be interesting to describe its principal features and the method of operation. For this information we are indebted to Mr. Thorrowgood.

The main principle is that all offices connected to the new automatic exchange are able to call each other by means of a rotary calling device fixed at the base of each instrument. Suppose a person in Office No. 20 wishes to communicate with No. 39; he removes the receiver off the hook and places his finger in the hole of the disc or dial opposite 3, and rotates the dial as far as he can — that is, to the stop. On being released, the dial is forced back again to normal by means of a spring inside the instrument. He next places his finger in a

hole in the dial opposite 9, and again rotates the dial to the stop, once more releasing the dial, which flies back to normal. His line is then connected direct to No. 39. He then places his receiver to his ear and hears the sound of the bell ringing at No. 39, but the latter will answer promptly and the two will have been put into direct communication automatically without the aid of any operator. If No. 39 had been engaged, a « busy-back » tone would have been heard by No. 20 in his receiver, which he would then hang up on the hook, and thus free his line for anyone wishing to speak to him. After a short time he can ring No. 39 again, and if now disengaged will get through to him. It is obvious that No. 39 can only carry on one conversation at a time, and this condition holds whether it is a manual or automatically operated board. The time taken in calling No. 39 will be two or three seconds. The shortness of the time is due, first, to the mechanism being in position ready, waiting to operate, and operating directly a call is commenced to be made; secondly, as will be shown presently, to the quickness with which the mechanism moves.

A feature of the existing manually operated switchboard is that either of the four operators can connect any of the offices connected to her position to the offices connected to the other three positions without moving from her place. This feature has been retained with the additional automatic switchboard connections, so that, if No. 20 on the automatic switchboard requires to speak to No. 61 on the manual switchboard, No. 20 will call, or « dial », as it is spoken of, to the manual switchboard operator in the same way as is done at present, and the operator will put extension line 20 on the automatic board through to extension line 61 on the manual board, when the two will be in direct communication for speaking exactly as they would be if both were connected to the manual switchboard. If No. 20 on automatic board wished to speak to a person connected with the Post Office telephone system, No. 20 on the automatic board would « dial » to the manual switchboard operator and ask to be put through to the Post Office in precisely the same way as is done at present.

Should No. 61, or a subscriber on the Post Office system, require to speak to No. 20 on the automatic board, to make it easy for the operator on the manual switchboard to determine quickly which jack she has to plug into, it has been arranged to prefix the number ascribed to each office connected to the automatic switchboard with the letter A; thus, the telephone number of No. 20 on the automatic switchboard at Waterloo will appear in the company's telephone directory as Waterloo A 20. Hence, No. 61 will ask the operator on the manual switchboard after he has removed the receiver from the hook of his telephone instrument for «A 20». The operator will then connect No. 61 on manual board direct through to No. 20 on the automatic switchboard without in any way interfering with the automatic portion of the automatic switchboard, the operations being practically similar to those on the manual switchboard at present. This has been arranged to save time in switching through at the switchboard, and incidentally to give a quick service.

Under the new arrangement, all the offices connected to the company's telephone switchboard system are able to communicate telephonically with each other, whether on a manual or on an automatic switchboard, or whether on a code or selective ringing omnibus circuit, or an office connected direct to the switchboard. For instance, Reading, Feltham or Richmond are also able to communicate with each other or with offices at Waterloo, or with Woking, Basingstoke, Eastleigh or Southampton, or *vice versa*. By arrangement with the Post Office, however, it is only possible for offices connected direct to either of the switchboards to be connected direct to the subscribers on the Post Office telephone system. This condition obtains to-day. It would be possible to arrange all the company's telephones, whether on omnibus circuits, or connected direct to the switchboards, to operate automatically, but the equipment at present price would be too costly.

The advantages of the automatic telephone

Fig. 8. — Automatic telephone : table set.

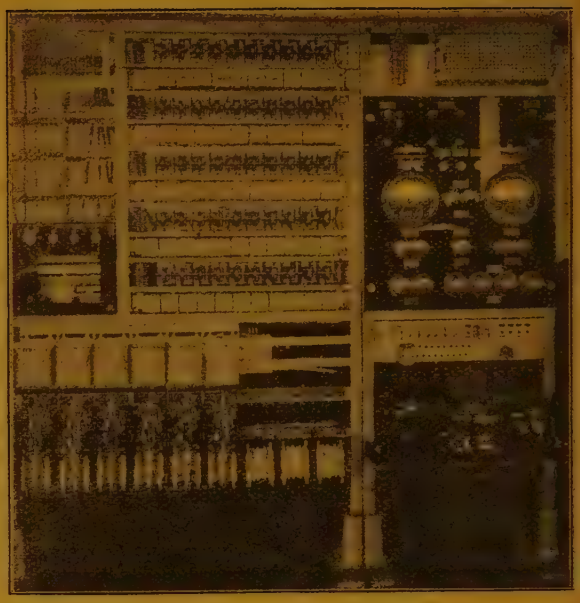


Fig 10. — Front view of switchboard.

Fig. 9. — Automatic telephone : wall set.

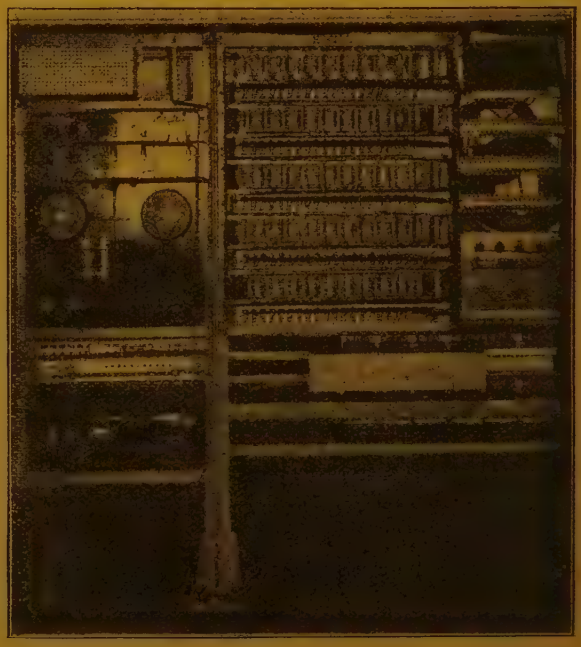


Fig. 11. — Back view of switchboard.

switchboard are : 1° the calling subscriber is immediately connected to the called office, or immediately receives an intimation that the called subscriber is engaged; 2° the automatic switchboard is continually in service day and night; 3° directly two lines are connected they cannot be interfered with and the communication is secret; 4° although figures 10 and 11 show the apparatus to be complicated, it is not excessively so, and it is so arranged that should a fault arise, the whole of the faulty part can be removed bodily by pulling it out and replacing it by another part, the operation taking only a few seconds to complete.

The switchboard, as illustrated, consists of two panels, one on the right for the power switches, and the small motor generator seen at the bottom in right-hand corner for the ringing and operation of the various automatic devices forming the system. On the left-hand panel are mounted the pre-selectors, first selectors, various relays and fault-indicating lamps.

The instruments stand normally ready to receive a call, but immediately the receiver is taken off the switch-hook a contact is changed, so that if a call is made for that instrument, a « busy-back » tone is sent to the caller. It is, therefore, of the utmost importance, from an efficiency point of view, that the receiver should be returned to the switch-hook as soon as possible after the conversation is completed, and kept on the switch-hook.

The first automatic action, then, is when the receiver is lifted off the swich-hook, when the instrument is disconnected from the receiving position, and the instrument is connected to an apparatus called a pre-selector. There is a pre-selector allotted and connected to each extension line, which consists of a set of movable contact arms called « wipers », which rotate at a speed of 60 per second over a bank of 10 fixed contact strips, by means of interrupted currents operating an armature which drives the mechanism rotating the wipers. The series of fixed contacts are connected separately to an equal number of selectors, which act as wires to connect one subscriber or office to the lines of another office. Six selectors are provided on the Waterloo automatic switchboard. More can be added if it is found necessary. It may be that three conversations are going on over the automatic switchboard at the time No. 20 called No. 39; the wipers in connection with No. 20 line will commence to rotate and get to the first fixed contacts, but as No. 1 contact is engaged the wiper will pass to No. 2, similarly pass No. 3, but getting to No. 4, which is disengaged, No. 20 will be connected to No. 4 selector. The time taken to complete this operation is one-fifteenth of a second. It must be quick, as the pre-selector must find an idle or disengaged selector between the time the calling subscriber takes his receiver off the hook and commences to dial for the number he requires. The longest time taken with the present equipment would be one-tenth of a second. Having been connected to No. 4 selector, the connection is maintained by a locking device, and the calling office dials for the number he wants, in the manner described above. Say No. 20 is wanting No. 39 : he places his finger in the hole on dial opposite 3, and rotates the dial to the stop, and then releases the dial. In being returned by the force of the spring, a contact is broken and made once for every digit, in this case three times. Three separate intermittent currents are, therefore, sent from a 60-volt accumulator battery provided to operate the automatic switchboard.

As these three intermittent currents pass through the selector electro-magnet, a ratchet device raises the shaft of the selector up three spaces in a vertical direction at the rate of 30 spaces per second, the total time taken being one-tenth of a second, and the wipers on the shaft are in line with the subscriber's contacts number from 31 to 39. The caller next dials 9, and as the dial is released and returns to normal, the current is broken and made nine times. An electro-magnet operates on another ratchet device and rotates the wipers in a horizontal plane, nine units in nine-thirtieths of a second, when it comes to rest on No. 9 contact, which connects up by means of a relay the « busy-back » circuit,

or joins the called subscriber's instrument up to the calling office, and rings the called office's bell. The called subscriber takes his receiver off the hook, when he is immediately in direct communication with the caller. When the conversation is completed, both the calling and called offices replace their receivers on the hook, and the electro-magnets on the relay selectors, and the whole apparatus at both offices, return to normal automatically and at once.

[621 .31]

5. — International conference of the great electric supply systems working at very high tension.

An International Conference on the subject of the great electric supply systems that work at very high tensions, met, on the initiative of the French Union of Electrical Industries (Union des Syndicats de l'Electricité) with the co-operation of the International Electrotechnical Commission, in Paris, during the week ending 26 November last.

This extremely important subject was dealt with in papers and discussions which cannot fail to be of interest to all those who are concerned in the transmission of energy over long distances.

During the first portion of the Conference, the generators and transformers connected with the transmission lines were under consideration. It was admitted that, throughout the world, generators and transformers which are characterized with a high drop of voltage and which, consequently, are to some extent less subject to the destructive results of short circuiting, were preferred on the ground of safety.

The second section dealt more particularly with very high tension transmission lines.

Some members of the Conference strongly recommended the adoption of open-air substations, but it was not agreed that the substations in buildings were to be abandonned even in the case of very high tension lines.

One conclusion to be drawn from the work of this section is that neither high-tension insulators of the « petticoat type », nor those of the pattern using discs arranged in series, are at present completely satisfactory. Contradictory evidence was given relating to the components of these series (of insulators) which were subjected to the greatest difference of voltage. As a result it was agreed, at the unanimous desire of the Conference, that the investigations should proceed and that further experiments should be made.

Having ascertained that no serious difficulty had arisen at places where the high-tension transmission lines cross the railways, in countries where the regulations for safety were reasonable, the Conference expressed the desire for an international agreement for standardising the regulations to be observed where high-tension lines cross railways.

The third section was more particularly concerned with the working of very-high-tension systems which are at present of great interest because they allow the large district central stations to be interconnected, enable connections to be made between waterpower and steam plants, and finally facilitate the feeding of sub-stations situated along the great railway systems.

We think it may be of advantage to our readers to know that the proceedings of this Conference can be obtained from the « Union des Syndicats de l'Electricité », 7, rue de Madrid, Paris, or consulted at their office at that address. The French Union of Electrical Industries will evidently be pleased to furnish particulars as far as possible on this subject to Railway Companies who may express a desire for information about it.

E. U.

[625 .233 & 625 .234]

6. — Circular from the French Minister of Public Works giving instructions for the total abolition of gas lighting in all passenger coaches, and also of the coal stoves which still exist in some vehicles.

(*Annales des mines.*)

The Minister,

to the railway companies;
to the management of the State Railway;
to the members of the Ceinture Railway Syndicate;
to the management of the Alsace and Lorraine Railways.

Paris, 12 October 1921.

One of my predecessors has already, in a circular dated 17 January 1914, drawn your attention to the danger incurred by carrying inflammable materials or by burning the same in trains, and has asked you not to use gas lighting in any new stock intended for fast trains, and also to gradually abandon this means of illumination in the stock already in use. You were also asked to undertake in a similar way the abolition of coal stoves which still exist in a certain number of vehicles.

The war has hindered the execution of these instructions, but I regret to have to say that since then, in spite of reminders from the control authorities, some railway administrations have not paid sufficient attention to carrying out a measure which is of supreme importance in the interest of the safety of passengers.

I therefore most emphatically ask you to give the matter urgent attention and use all possible means to completely replace gas lighting, this should be carried out as quickly as possible on all passenger stock (including brake vans) used on fast trains. The conversion should be completed at the latest by 1 January 1923.

The recent accident in Batignolles tunnel has emphasised the fact that the danger of gas lighting is not less on other classes of trains, especially in the case of suburban trains running on congested lines and carrying a large number of passengers.

Also, in spite of the technical objections which have been raised against the extension of electric lighting on trains which make frequent stops and which accounted for the instructions of the circular of 17 January 1914 being applicable to fast trains only. I ask you to also investigate the question of replacing the gas lighting in all the coaches which are still so fitted, commencing on the suburban stock of Paris and other large towns.

You must let me have, by 1 December next at the latest, a detailed programme of the steps you will take to be in a position to comply with the following :

a) Complete abolition of gas lighting on all stock intended for use on fast trains not later than 1 January 1923;

b) Gradual abolition, carried out as quickly as possible, of gas lighting in all other coaches and brake vans for passenger trains, commencing with suburban stock used at the large towns, with an estimate of the time which appears to you to be absolutely necessary to carry out this conversion, both for the suburban stock and for the remainder. You will please also state the number of vehicles which you estimate you will convert each year. In any case, the time allowed should not extend later than the 1 January 1924 for the suburban trains, and the 1 January 1925 for the other stock;

c) Complete abolition of the coal stoves which still exist on some vehicles, with a maximum time limit of two years.

Kindly acknowledge receipt of this circular.

I may add, that in cases where accidents are found to be caused or aggravated by any non-observance of the present circular, you will be held personally responsible.

The Minister of Public Works,
YVES LE TROCQUER.

ERRATA, CORRIGENDA

Bulletin of August 1921 :

Page 1016, 1st column, 6. G. N., Engine and tender, *instead of :* « 1920... 163 tons », *read :* « 1920... 120 tons. »

Page 1023, 2nd column, 3. N. E., *instead of :* « No special precautions », *read :* « Speeds restricted and warning boards fixed. »

Bulletin of October 1921 :

Page 1533, at the end of the Abstract of replies of British railways, *insert*, under the tittles

ADMINISTRATION.	Superheater engines. In 1910.	Superheater engines. Present time. Including conversions.	Superheater engines. On order.	Non superheater engines. Since 1910.	Non superheater engines. On order.
The following data :					
« South Eastern & Chatham Railway	...	57	24	Not stated.	... »

Bulletin of November 1921 :

Page 1928, table A, *insert* the following data between the 1st and the 2nd line from the top :

« Euston Station, London (England) . .	44 —	6	15	2.50	»

and between the 2nd and the 3rd line :

« Broad St. Station, London (England) .	No through trains	4	9	2.25	»

Page 1929, table B : 1° *insert* the following data under « Stub terminals », after « Exchange Station » :

« Broad St. Station, London (England) . . .	All.	...	9	438	...	438	▲	...	▲	8	...	30	100	...	...	»

2° after « Paddington Station... » :

« Euston Station, London (England)	10	11	15	86	103+	189	⊙	⊙	⊙	4	3	12■	100	...	. .	»

3° *Add*, at the end of the foot-note, the following sentences :

« ■ Trains operated in one direction only.
« ▲ In 60 minutes 28 scheduled trains arrive. In 60 minutes 26 schedules trains depart.
« ⊙ In 60 — 9 — — — In 60 — 10 — — —
« + 20 trains are mail trains. »

Page 1931, 1st column, lines 11, 12 and 13 from the top, *instead of :* « while of a total of 5 075 passenger trains operated in 11 British terminals 3 999, or 79 per cent were suburban », *read :* « while of a total of 5 244 passenger trains operated in 12 British terminals 4 085, or 78 % were suburban ».

Page 1931, table C, *add* 1° on the top :

« Broad St. Station, London (England).	Turntable.	»

and 2° between the 1st and the 2nd line :

« Euston Station, London (England).	Turntable or wye.	»

Page 1932, table D, *add* : 1° on the top :

« Broad St. Station, London (England)	Steam and electricity.	100*	0	»

2° *after* « Paragon Station... » :

» Euston Station, London (England)	Steam.	100	0	»

3° at the back, after the foot-note n° 3 :

« * Steam trains. »

Page 1932, 2nd column, line 7 from the back, *instead* of : « In two of the twelve terminals », *read :* « In three of the fourteen terminals. »

Page 1933, appendix B, *after* Great Eastern Ry. Cy., *insert :*

« London & North Western Ry. Co.	Broad St. Station.	London, England.	»
« — — —	Euston Station.	— —	»